

OCCASIONAL PAPERS
from the
MUSEUM of
VICTORIA
Vol. 3 (1987)

MELBOURNE AUSTRALIA

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Director Robert Edwards

Editor Gary C. B. Poore

Published by Order of the Council
November 1987

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Occasional Papers from the Museum of Victoria

The Museum of Victoria was formed in 1983 by the merger of the National Museum of Victoria (established in 1854) and the Science Museum of Victoria (established in 1870). Among the Museum's objectives are scholarship and education in the fields of natural history, science and technology, and history of human society. The Museum of Victoria publishes two scientific serials to further these objectives, *Memoirs of the Museum of Victoria* (until 1983 *Memoirs of the National Museum of Victoria*) and *Occasional Papers from the Museum of Victoria*.

The *Memoirs* publishes papers on original research in the natural sciences pertinent to Victoria and/or the Museum's collections. All contributions are assessed by independent referees before publication.

The *Occasional Papers* are research documents of sufficient importance to be preserved but which are not appropriate for primary scientific publication. Papers are factual rather than interpretative studies, may be of special local interest, or may be longer than a normal scientific paper. Contributions will be refereed if appropriate.

Two copies of the manuscript with accompanying plates and figures should be submitted to the Scientific Editor,

Museum of Victoria, Swanston Street, Melbourne, Victoria 3000. Authors should consult a recent volume of the *Occasional Papers* to acquaint themselves with format.

Manuscripts must be typed on A4 paper, double-spaced, on one side of the paper and with ample margins. Final manuscripts on floppy discs are encouraged. Tables, captions to text figures and plates must be attached to the manuscript as final pages. Underlining in the text should be restricted to generic and specific names. Measurements must be in the metric system (SI units).

References should be listed alphabetically at the end of the manuscript. Journal citations must be in full. References to books must give the year of publication, edition, name of publisher and city of publication. Titles of books and names of journals should be underlined.

Photographs must have clear definition and may be submitted as either glossy or flat prints at the actual size for reproduction. Line drawings for text figures should be in black ink on white card or drawing film. Maximum full page size is 177 mm wide by 220 mm, single column width is 86 mm. Clear lettering must be inserted. Original drawings up to twice final size are acceptable.

The Bass Strait Survey: biological sampling stations, 1979-1984

Robin S. Wilson and Gary C. B. Poore

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Abstract. Wilson, R.S., and Poore, G.C.B. (1987). The Bass Strait Survey: biological sampling stations, 1979-1984. *Occasional Papers from the Museum of Victoria* 3: 1-14.

Between 1979 and 1984 the Museum of Victoria undertook a survey of the benthic invertebrates and demersal fishes of Bass Strait. This report provides the position, depth, sediment details and sampling methods used for over 200 stations.

Introduction

Bass Strait, between Victoria and Tasmania, is the widest area of the continental shelf of temperate Australia. Its marine fauna is poorly known. Except for recent intensive studies of some of the larger inlets along the coast, Port Phillip Bay and Western Port in particular (Poore, 1986) collecting has been largely haphazard and selective for particular taxa. Two European expeditions, by HMAS "Challenger" (1873-1876) and the "Galathea" (1950-1952) and several Australian ventures have collected marine animals from Bass Strait (Poore, 1979). Taxonomic studies of much of this material have been made but these fall far short of a comprehensive account of the marine fauna of the region.

In 1980 the National Museum of Victoria, now the Museum of Victoria, began an intensive survey of benthic invertebrates and demersal fishes of the Strait. The survey continued some sampling which had started earlier in the canyons of the Eastern Slope. The survey was an integral part of a larger study, co-ordinated by the Victorian Institute of Marine Sciences (VIMS), of water chemistry, currents and sediments.

Among other things, the objectives of the Bass Strait Survey were to produce annotated checklists of the major benthic and demersal taxa, to determine the relative abundance and distribution of the species, and to provide material for taxonomic study. Already material from many taxa has been distributed to taxonomists. This contribution provides the environmental data necessary to understand species distributions and community composition.

Methods

Sampling design

A preliminary stratified sample plan was prepared using random placement of 33 stations in each of three strata. The strata were based on depth ranges, that is, 15-30 m, 30-60 m, and 60-120 m. To allocate samples the area was covered with a grid of 1357 10-km-square blocks, from which 99 were selected at random. The centre of selected blocks became sampling points.

As well as the random samples others were taken when possible. Their distribution was often determined by other activities of the ships used or by weather. The concentrations of stations in the eastern canyon region (cruise 79-K-1) and on the western slope (cruise 80-K-5) are essentially not part of the original plan. In this report random and non-random samples are not distinguished.

Station and cruise numbering

Stations were labelled sequentially and samples using different gear taken at the same location at different times have different station numbers. The acronym BSS prefixes all samples but can be substituted by the prefixes BSS-G (for Smith-McIntyre grab samples) or BSS-S (for rock dredge or WHOI epibenthic sled samples) or BSS-T (for trawl net samples). If the data for each of these are different from those detailed after the BSS listing these are given.

Stations in Part 2 of this list are prefixed BSS-Q and refer to the New Zealand Oceanographic Institute Q-numbering system which was used in parallel on the RV "Tangaroa" cruise.

Stations in Part 3 of the list are prefixed S05/84. These were taken on a cruise around Tasmania and include, as well as sites in Bass Strait, some from off other coasts of Tasmania.

The Victorian Institute of Marine Science cruise numbering system has been continued throughout the Bass Strait Survey except on the final FRV "Soela" cruise when the CSIRO number was used.

Stations BSS 1-30 and some others are not listed since no biological samples were obtained.

The data in the body of this paper are extracted from the "station" data-base which is part of the TITAN® computer system operated by the Museum of Victoria.

Position fixing

Latitude and longitude are given with a degree of accuracy appropriate to the position fixing capabilities of the vessel involved. Thus for cruises 80-Sa-1 (FV "Sarda"), 80-K-5 (HMAS "Kimbla") and 83-SG-1, 83-SG-2 (FV "Silver

Gull”) where radar navigation equipment was used station positions are given only to the nearest minute of latitude and longitude. For cruises 79-K-1 (HMAS “Kimbla”), 81-HK-1 (FRV “Hai Kung”) and 81-T-1 (RV “Tangaroa”) where vessels were also equipped with satellite navigation equipment position fixes are accurate to one decimal place of minutes of latitude and longitude. For this reason only during cruises 81-HK-1 and 81-T-1 was it possible to record accurately different positions for different samples taken sequentially at a single station. Only during cruise 81-HK-1 was it possible to give start and finish positions for trawl tows.

Sampling techniques

The planned sampling schedule was to collect two Smith-McIntyre grab samples, one epibenthic sled sample and one trawl sample from each station. Unfortunately unavailability of some items of equipment, failure and loss of gear during cruises and limited capabilities of some vessels resulted in incomplete sampling at some stations. Where possible sampling at these stations was completed on later cruises, with new station numbers being allocated. Brief notes on sampling equipment and standard techniques follow.

Smith-McIntyre Grab. The Smith-McIntyre grab is a spring-loaded quantitative sampling device which recovers a sample from a 0.1 m² area of sediment (Smith and McIntyre, 1954). Two grab samples were collected at each station, one sample being subsampled for sediment analysis and remaining material combined for faunal analysis. Samples of less than about 8 litres (about half of the maximum capacity of the grab) were rejected and the sample repeated.

Gravity-driven grab. This gravity-operated grab also sampled a 0.1 m² area and was used during cruise 80-K-5 while the more efficient Smith-McIntyre grab was being repaired.

Woods Hole Oceanographic Institution epibenthic sled. The sled used in this survey was a 3/4-scale version of a design of Hessler and Sanders (1967) incorporating a 1-mm-mesh net liner. The net differed from that in the original design only in being non-tapering. (A tapered net full of coarse sediment and epifauna was found impossible to empty easily on deck.) The epibenthic sled collected qualitative samples of epifauna and shallow infauna. A tow of 3-5 minutes at 1-2 knots was found to be sufficient to fill the sled.

Naturalists dredge. This small dredge (gape 0.6 m x 0.2 m approx) with double 1.4 mm mesh liner bag was used in early cruises in 1979 and 1980 prior to the availability of the more efficient epibenthic sled.

Rock dredge. This dredge of gape 0.2 x 0.5 m approx constructed with 12 mm wire mesh was used to collect samples of rock and epifauna from rough bottoms unsuitable for the epibenthic sled. The rock dredge was used with or without a canvas liner bag.

Pipe dredge. This dredge constructed of steel pipe of 0.2 m diameter was used to collect sediment and faunal samples where a grab or more efficient dredge was not available. The pipe dredges used either had a closed steel baseplate or a perforated steel baseplate.

Agassiz trawl. An Agassiz trawl, consisting of a net of approximately 2 cm mesh attached to a steel frame approx-

imately 1.5 m wide was used during cruise 81-T-1 for experimental sampling of fishes.

Otter trawl. A variety of otter trawls was used to sample fishes during the survey. Dimensions of each net (head-rope length, cod end mesh size) are given with each station. Duration of tows was usually 15-30 minutes, depending on speed and bottom type, although longer tows (up to 1.5 hours) were made during Cruise 81-HK-1 since the vessel FRV “Hai Kung” was also engaged in fisheries research.

Engel's trawl. A high-lift demersal trawl used from FRV “Soela”.

Frank and Bryce trawl. A trawl similar to the Engel' trawl used for a single sample.

Shipboard treatment of samples

Samples from the grabs, sled and dredges were separately washed through a nest of sieves (smallest with aperture 0.5 mm). Later laboratory sorting of samples was facilitated by floating off the light fraction (containing mostly animals) from the heavier fraction (containing mainly sediment and shelled animals). This took place using sea-water hoses before fixation. All material was preserved in 4% buffered formalin and where possible selected samples were first narcotised with 0.5% propylene phenoxetyl. Many epibenthic sled samples were unmanageably large and these were subsampled prior to sieving. Representative samples of all fishes and macroinvertebrates from trawl samples were collected (or in the case of well known taxa presence was noted). Field notes were made of dominant groups and all fishes preserved in 10% buffered formalin.

Sediment analysis

Analysis of sediments was based on subsamples taken from Smith-McIntyre grab or closed pipe dredge samples. Sediments were described in the field from a visual impression or according to the classification of Shepard (1954). These descriptions are the basis of the notes for each station. Sediments from cruises 79-K-1 and 80-Sa-1 were not analysed further. Sediments from cruises 83-SG-1 and 83-SG-2 were described in the field although unsorted sediment samples could not be collected with the gear available.

Sediment subsamples from cruises 80-K-5, 81-HK-1 and 81-T-1 were analysed in the laboratory by M. Marsden and A. Marshall, Geology Department, University of Melbourne. The methodology used was given by Donaldson and Marsden (1977) and is based on settling velocities of samples of particles in a water column. Settling rates were measured as accumulating weight on a collecting pan over time (for coarser fragments) and by photoextinction of a transmitted light beam (for the mud fraction). Means and standard deviations (a measure of sorting) of particle size are given where available in Appendix 1. Percentage carbonate and percentages of gravel, sand, silt and clay are also given where possible.

Acknowledgements

The Bass Strait Survey has involved numerous individuals in the field and in the laboratory. To all we are extremely grateful. We thank our colleagues at the Museum of Victoria: M. Gomon, C.C. Lu, F. Wiedenmeyer, P. Forsyth, H. Lew Ton, several student helpers and volunteers from the Marine Research Group.

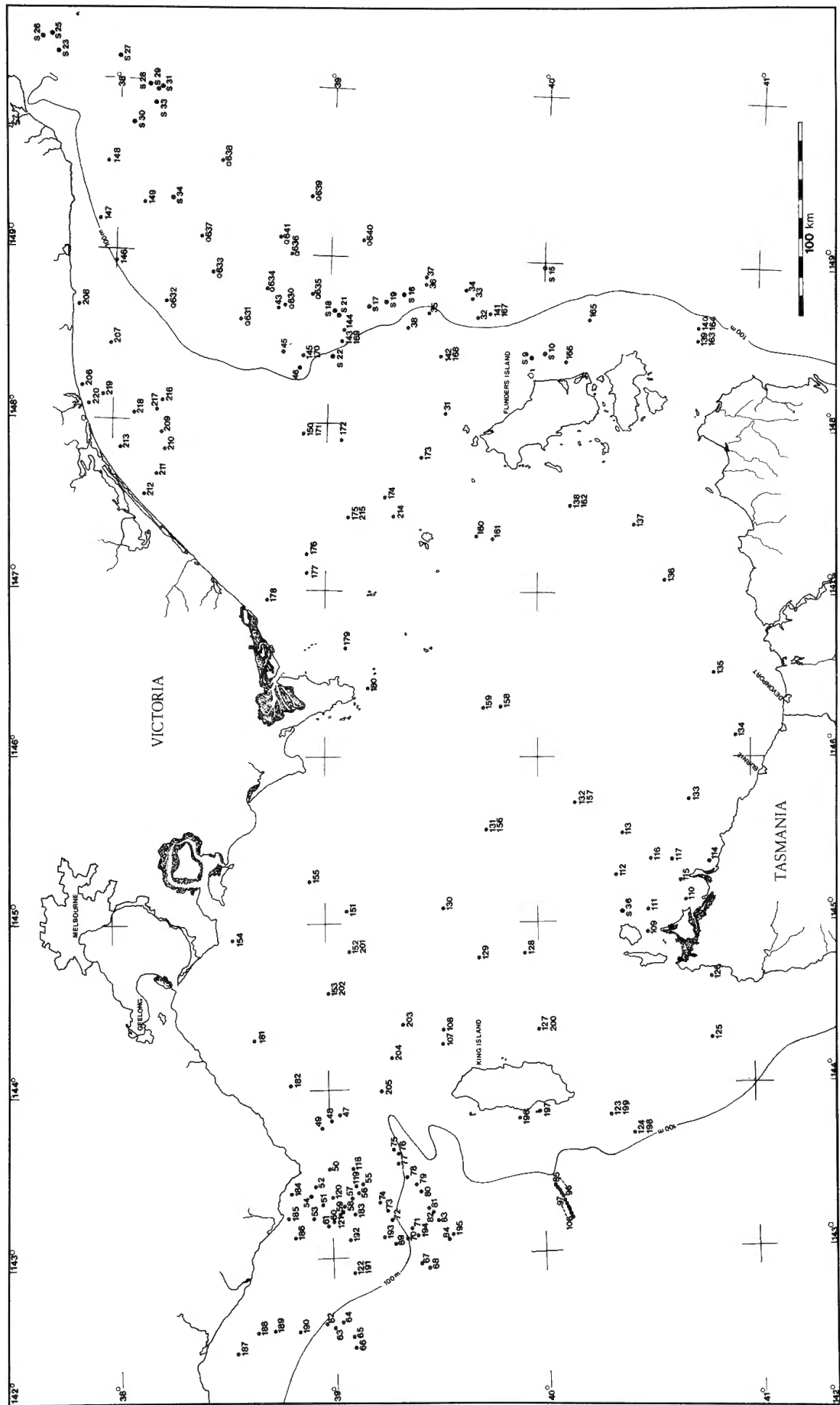


Figure 1. Bass Strait showing the locations of sampling stations. S05/84 stations are prefixed "S".

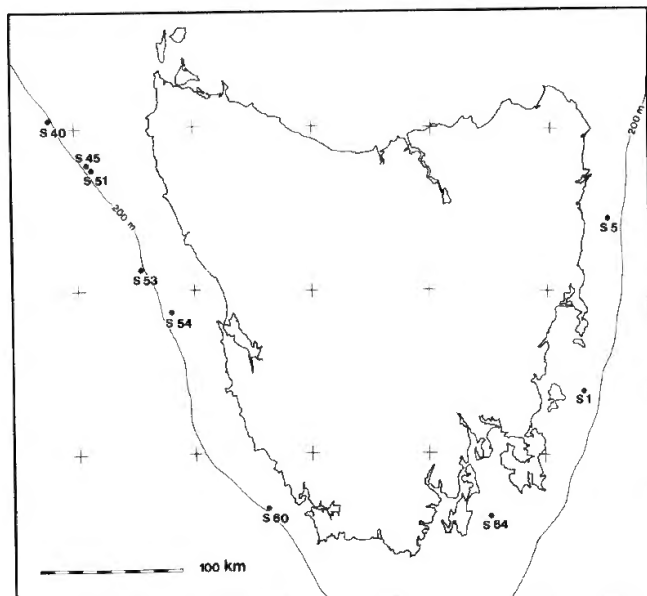


Figure 2. Tasmania showing locations of southern S05/84 stations (here prefixed "S").

Staff and students at the University of Melbourne Department of Geology assisted in the field and made data available for this report: M. Marsden, A. Marshall and J. Keene.

Shiptime was generously provided by the Fisheries and Wildlife Department of Victoria, the New Zealand Oceano-

graphic Institute, The Institute of Oceanography, National Taiwan University, and the Taiwan Fisheries Institute, the Royal Australian Navy, CSIRO Division of Fisheries, and M. and C. Griffiths, Lakes Entrance. Without their support the program would not have been completed. We are indebted to the directors or principals of these organisations. We also thank the masters and crews of the vessels on which we worked for their willingness and co-operation.

The impetus for commencing work in Bass Strait was given by the Victorian Institute of Marine Sciences which also co-ordinated the study. The survey was funded in part by a Marine Sciences and Technologies Grant from the Australian Department of Science and Technology.

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List of stations

Part 1. BSS stations, 1979–1983

BSS 31 Eastern Bass Strait, 22 km NNE of North Point, Flinders Island, (39°34.3'S, 148°4.0'E), 37 metres, coarse sand, G.C.B. Poore, 26 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: naturalists' dredge.

BSS 32 Eastern Bass Strait, 60 km E of North Point, Flinders Island, (39°41.7'S, 148°39.5'E), 115 metres, muddy sand, G.C.B. Poore, 27 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: naturalists' dredge.

BSS 33 Eastern Bass Strait, 50 km NE of Babel Island, Tasmania (39°40.3'S, 148°46.5'E), 293 metres, rock, coarse sand, G.C.B. Poore, 27 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: naturalists' dredge.

BSS 34 Eastern Bass Strait, 55 km NE of Babel Island, Tasmania (39°38.2'S, 148°49.2'E), 695 metres, rock sand mud, G.C.B. Poore, 27 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: naturalists' dredge.

BSS 35 Eastern Bass Strait, 70 km ENE of North Point, Flinders Island, (39°28.4'S, 148°41.8'E), 110 metres, coarse sand, G.C.B. Poore, 28 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: naturalists' dredge.

BSS 36 Eastern Bass Strait, 82 km ENE of North Point, Flinders Island, (39°27.7'S, 148°41.4'E), 293 metres, coarse sand, G.C.B. Poore, 28 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: naturalists' dredge.

BSS 37 Eastern Bass Strait, 87 km ENE of North Point, Flinders Island, (39°28.2'S, 148°52.4'E), 841 metres, muddy sand, G.C.B. Poore, 29 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: naturalists' dredge.

BSS 38 Eastern Bass Strait, 67 km ENE of North Point, Flinders Island, (39°22.4'S, 148°38.7'E), 73 metres, coarse sand, G.C.B. Poore, 29 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: naturalists' dredge.

BSS 43 Eastern Bass Strait, 105 km S of Cape Conran, Victoria (38°46.8'S, 148°40.6'E), 2122 metres, sandy mud, G.C.B. Poore, 30 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: pipe dredge.

BSS 45 Eastern Bass Strait, 112 km SSE of North Point, Flinders Island (38°47.2'S, 148°25.2'E), 585 metres, muddy sand, G.C.B. Poore, 31 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: Petersen grab.

BSS 46 Eastern Bass Strait, 116 km ESE of Seaspray, Victoria (38°52.2'S, 148°20.6'E), 110 metres, coarse sand, G.C.B. Poore, 31 Mar 1979, HMAS "Kimbla" (Cruise number 79-K-1)
Samples taken: Petersen grab.

BSS 47 Central Bass Strait, 36 km S of Cape Otway, Victoria (39°03'S, 143°51'E), 85 metres, medium sand, carbonate, G.C.B. Poore, 7 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, naturalists' dredge.

BSS 48 Central Bass Strait, 32 km SE of Cape Otway, Victoria (39°01'S, 143°49'E), 81 metres, coarse sand, G.C.B. Poore, 7 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, naturalists' dredge.

BSS 49 Central Bass Strait, 25 km ESE of Cape Otway, Victoria (39°59'S, 143°47'E), 81 metres, sand, 50% carbonate, G.C.B. Poore, 7 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, naturalists' dredge.

BSS 50 Western Bass Strait, 15 km S of Cape Otway, Victoria (39°00'S, 143°32'E), 79 metres, medium sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, naturalists' dredge.

BSS 51 Western Bass Strait, 11 km SSW of Cape Otway, Victoria (38°58'S, 143°29'E), 67 metres, medium sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, naturalists' dredge. (foot of submarine ridge)

BSS 52 Western Bass Strait, 11 km SW of Cape Otway, Victoria (38°57'S, 143°27'E), 49 metres, coarse sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: gravity grab, naturalists' dredge.

BSS 53 Western Bass Strait, 25 km WSW of Cape Otway, Victoria (38°55'S, 143°25'E), 67 metres, medium sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: gravity grab, naturalists' dredge.

BSS 54 Western Bass Strait, 14 km WSW of Cape Otway, Victoria (38°54'S, 143°22'E), 70 metres, very coarse shelly sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: none.

BSS 55 Western Bass Strait, 32 km SSW of Cape Otway, Victoria (39°09'S, 143°26'E), 85 metres, coarse carbonate sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, naturalists' dredge.

BSS 56 Western Bass Strait, 31 km SSW of Cape Otway, Victoria (39°08'S, 143°24'E), 77 metres, medium sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, naturalists' dredge.

BSS 57 Western Bass Strait, 35 km SSW of Cape Otway, Victoria (39°06'S, 143°21'E), 59 metres, coarse sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, naturalists' dredge.

BSS 58 Western Bass Strait, 29 km SW of Cape Otway, Victoria (39°05'S, 143°19'E), 47 metres, coarse sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, pipe dredge.

BSS 59 Western Bass Strait, 30 km SW of Cape Otway, Victoria (39°03'S, 143°16'E), 70 metres, coarse sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, pipe dredge.

BSS 60 Western Bass Strait, 32 km WSW of Cape Otway, Victoria (39°02'S, 143°14'E), 79 metres, medium carbonate sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, pipe dredge.

BSS 61 Western Bass Strait, 32 km WSW of Cape Otway, Victoria (39°00'S, 143°11'E), 68 metres, coarse sand, G.C.B. Poore, 8 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, pipe dredge.

BSS 62 Western Bass Strait, 80 km WSW of Cape Otway, Victoria (39°59'S, 142°37'E), 94 metres, coarse sand, G.C.B. Poore, 9 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, pipe dredge.

BSS 63 Western Bass Strait, 75 km SSE of Port Fairy, Victoria (39°01'S, 142°35'E), 90 metres, coarse sand, G.C.B. Poore, 9 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, pipe dredge.

BSS 64 Western Bass Strait, 79 km SSE of Port Fairy, Victoria (39°02'S, 142°38'E), 119 metres, coarse sand, G.C.B. Poore, 9 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, pipe dredge.

BSS 65 Western Bass Strait, 76 km SSE of Port Fairy, Victoria (39°05'S, 142°33'E), 207 metres, very fine sand, G.C.B. Poore, 9 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, pipe dredge.

BSS 66 Western Bass Strait, 82 km SSE of Port Fairy, Victoria (39°06'S, 142°29'E), 630 metres, clay, G.C.B. Poore, 9 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Pipe dredge. (depth recorder beyond range; depth dubious)

BSS 67 Western Bass Strait, 80 km SSE of Cape Otway, Victoria (39°26'S, 142°57'E), 113 metres, medium sand, G.C.B. Poore, 9 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)
Samples taken: Smith-McIntyre grab, pipe dredge.

BSS 99 Western Bass Strait, 53 km W of Stokes Point, King Island (40°06'S, 143°18'E), 139 metres, medium sand, G.C.B. Poore, 11 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)

Samples taken: Smith-McIntyre grab (station on a transect down the western slope).

BSS 100 Western Bass Strait, 54 km W of Stokes Point, King Island (40°06'S, 143°17'E), 158 metres, medium sand, G.C.B. Poore, 11 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)

Samples taken: Smith-McIntyre grab (station on a transect down the western slope).

BSS 101 Western Bass Strait, 55 km W of Stokes Point, King Island (40°06'S, 143°16'E), 187 metres, fine sand, G.C.B. Poore, 11 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)

Samples taken: Smith-McIntyre grab (station on a transect down the western slope).

BSS 102 Western Bass Strait, 57 km W of Stokes Point, King Island (40°07'S, 143°16'E), 144 metres, G.C.B. Poore, 11 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)

Samples taken: Smith-McIntyre grab (no sample, station on a transect down the western slope).

BSS 103 Western Bass Strait, 58 km W of Stokes Point, King Island (40°07'S, 143°15'E), 144 metres, coarse sand, G.C.B. Poore, 11 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)

Samples taken: Smith-McIntyre grab (station on a transect down the western slope).

BSS 104 Western Bass Strait, 59 km W of Stokes Point, King Island (40°07'S, 143°14'E), 185 metres, sandy mud, G.C.B. Poore, 11 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)

Samples taken: Smith-McIntyre grab (station on a transect down the western slope).

BSS 105 Western Bass Strait, 61 km W of Stokes Point, King Island (40°07'S, 143°14'E), 229 metres, clayey sand, G.C.B. Poore, 11 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)

Samples taken: Smith-McIntyre grab (station on a transect down the western slope).

BSS 106 Western Bass Strait, 63 km W of Stokes Point, King Island (40°08'S, 143°13'E), 495 metres, very fine sand, G.C.B. Poore, 11 Oct 1980, HMAS "Kimbla" (Cruise number 80-K-1)

Samples taken: Smith-McIntyre grab (station on a transect down the western slope).

BSS 107 Central Bass Strait, 28 km E of Cape Farewell, King Island (39°32.8'S, 144°16'E), 18 metres, fine sand, M. Gomon and G.C.B. Poore, 1 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 108 Central Bass Strait, 35 km E of Cape Farewell, King Island (39°32.8'S, 144°21'E), 27 metres, fine sand, M. Gomon and G.C.B. Poore, 1 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 109 Central Bass Strait, 9 km SSW of Cape Adansan, Three Hummock Island, Tasmania (40°30.9'S, 144°56'E), 27 metres, very coarse sand, M. Gomon and G.C.B. Poore, 2 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 110 Central Bass Strait, 5 km E of Cape Edie, Robbins Island, Tasmania (40°41.8'S, 145°07'E), 16 metres, fine shelly sand, M. Gomon and G.C.B. Poore, 3 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 111 Central Bass Strait, 8 km SE of Cape Adansan, Three Hummock Island, Tasmania (40°31.1'S, 145°04'E), 29 metres, mainly sand, M. Gomon and G.C.B. Poore, 3 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 112 Central Bass Strait, 23 km E of Cape Rochon, Three Hummock Island, Tasmania (40°22.2'S, 145°17'E), 40 metres, mainly sand, M. Gomon and G.C.B. Poore, 3 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 113 Central Bass Strait, 47 km E of Cape Rochon, Three Hummock Island, Tasmania (40°23.8'S, 145°32'E), 65 metres, muddy sand, M. Gomon and G.C.B. Poore, 3 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 114 Central Bass Strait, 6 km NE of Stanley, Tasmania (40°48.8'S, 145°22'E), 22 metres, fine sand, M. Gomon and G.C.B. Poore, 4 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 115 Central Bass Strait, 5 km N of North Point, Tasmania (40°40.3'S, 145°15'E), 33 metres, medium shell, M. Gomon and G.C.B. Poore, 4 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 116 Central Bass Strait, 20 km NNE of North Point, Tasmania (40°32.0'S, 145°23'E), 43 metres, muddy shell grit, M. Gomon and G.C.B. Poore, 4 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 117 Central Bass Strait, 20 km NNE of North Point, Tasmania (40°38.0'S, 145°23'E), 36 metres, muddy shell grit, M. Gomon and G.C.B. Poore, 4 Nov 1980, FRV "Sarda" (Cruise number 80-Sa-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 14 m headrope, 33 mm mesh cod end).

BSS 118 Western Bass Strait, 25 km S of Cape Otway, Victoria (39°06.0'S, 143°35.8'E), 95 metres, fine sand, M. Gomon et al., 31 Jan 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 36 m headrope, 33 mm mesh cod end, from 39°06.5'S, 143°31.4'E to 39°05.2'S, 143°27.0'E).

BSS 119 Western Bass Strait, 25 km S of Cape Otway, Victoria (39°06.7'S, 143°28.7'E), 92 metres, fine sand, M. Gomon et al., 31 Jan 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 36 m headrope, 33 mm mesh cod end, from 39°07.6'S, 143°25.0'E to 39°08.3'S, 143°20.6'E, 84 to 55 metres).

BSS 120 Western Bass Strait, 26 km SW of Cape Otway, Victoria (39°01.0'S, 143°22.1'E), 84 metres, medium sand, M. Gomon et al., 31 Jan 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 36 m headrope, 33 mm mesh cod end, from 39°01.0'S, 143°21.0'E to 39°00.6'S, 143°18.4'E).

BSS 121 Western Bass Strait, 31 km SW of Cape Otway, Victoria (39°01.0'S, 143°15.2'E), 84 metres, medium sand, M. Gomon et al., 31 Jan 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 36 m headrope, 33 mm mesh cod end, from 39°02.6'S, 143°15.1'E to 39°04.5'S, 143°11.1'E, 84 to 77 metres).

BSS 122 Western Bass Strait, 55 km S of Peterborough, Victoria (39°06.5'S, 143°54.2'E), 88 metres, very coarse sand, M. Gomon et al., 1 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: BSS-G (Smith-McIntyre grab).

BSS 123 Western Bass Strait, 25 km SSW of Stokes Point, King Island (40°19.6'S, 143°49.0'E), 73 metres, medium sand, M. Gomon et al., 1 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: BSS-G (Smith-McIntyre grab).

BSS 124 Western Bass Strait, 45 km SW of Stokes Point, King Island (40°26.1'S, 143°42.1'E), 81 metres, sediment data not recorded, M. Gomon et al., 1 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: BSS-G (Smith-McIntyre grab).

BSS 125 Central Bass Strait, 35 km WNW of West Point, Tasmania (40°47.4'S, 144°17.7'E), 99 metres, coarse sand, M. Gomon et al., 2 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-T (otter trawl, 36 m headrope, 33 mm mesh cod end, from 40°48.3'S, 144°17.1'E to 40°49.7z4S, 144°14.4'E, 99 to 102 metres).

BSS 126 Western Bass Strait, 5 km SW of Bluff Point, Tasmania (40°48.1'S, 144°38.0'E), 42 metres, bryozoans, M. Gomon et al., 2 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: BSS-G (Smith-McIntyre grab).

BSS 127 Central Bass Strait, 20 km ENE of Bold Head, King Island (40°0.0'S, 144°20.9'E), 46 metres, medium sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 2 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 45 mm mesh cod end, from 40°0.0'S, 144°20.9'E to 40°00.0'S, 144°23.6'E, 46 to 48 metres).

BSS 128 Central Bass Strait, 60 km ENE of Bold Head, King Island (39°56.4'S, 144°48.1'E), 49 metres, coarse shell, M.F. Gomon, G.C.B. Poore and C.C. Lu, 3 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 40 mm mesh cod end, from 39°56.4'S, 144°48.1'E to 39°53.9'S, 144°48.0'E).

BSS 129 Central Bass Strait, 59 km E of Lavinia Point, King Island (39°43.7'S, 144°46.7'E), 53 metres, medium sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 3 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 40 mm mesh cod end, from 39°43.7'S, 144°46.7'E to 39°42.8'S, 144°48.9'E) 53 to 55 metres.

BSS 130 Central Bass Strait, 96 km E of Cape Farewell, King Island (39°38.2'S, 145°5.1'E), 66 metres, fine sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 3 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 40 mm mesh cod end, from 39°38.2'S, 145°5.1'E to 39°38.8'S, 145°7.6'E).

BSS 131 Central Bass Strait, 99 km WSW of Cape Liptrap, Victoria (39°45.6'S, 145°33.8'E), 79 metres, very fine sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 3 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 40 mm mesh cod end, from 39°45.6'S, 145°33.8'E to 39°48.1'S, 145°32.6'E).

BSS 132 Central Bass Strait, 90 km N of Wynyard, Tasmania (40°10.8'S, 145°44.2'E), 76 metres, mud with sponges, M.F. Gomon, G.C.B. Poore and C.C. Lu, 3 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 40 mm mesh cod end, from 40°10.8'S, 145°44.2'E to 40°14.3'S, 145°42.8'E).

BSS 133 Central Bass Strait, 30 km N of Wynyard, Tasmania (40°33.1'S, 145°44.7'E), 68 metres, mud, M.F. Gomon, G.C.B. Poore and C.C. Lu, 3 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 40°33.1'S, 145°44.7'E to 40°36.2'S, 145°48.7'E).

BSS 134 Central Bass Strait, 32 km NW of Devenport, Tasmania (40°56.0'S, 146°5.4'E), 68 metres, mud, M.F. Gomon, G.C.B. Poore and C.C. Lu, 4 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 33 mm mesh cod end, from 40°56.0'S, 146°5.4'E to 40°46.0'S, 146°8.1'E, 68 to 64 metres).

BSS 135 Central Bass Strait, 39 km NNE of Devenport, Tasmania (40°49.8'S, 146°31.3'E), 68 metres, mud with bryozoa and sponges, M.F. Gomon, G.C.B. Poore and C.C. Lu, 4 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 40°49.8'S, 146°31.3'E to 40°48.2'S, 146°33.7'E, 68 to 70 metres).

BSS 136 Central Bass Strait, 42 km N of Stony Head, Tasmania (40°35.9'S, 147°5.1'E), 70 metres, sandy mud, M.F. Gomon, G.C.B. Poore and C.C. Lu, 6 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 40°35.9'S, 147°5.1'E to 40°35.4'S, 147°6.5'E, 70 to 68 metres).

BSS 137 Central Bass Strait, 47 km W of Cape Sir John, Cape Barren Island, Tasmania (40°26.9'S, 147°25.3'E), 55 metres, fine sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 6 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 40°26.9'S, 147°25.3'E to 40°26.42'S, 147°24.76'E).

BSS 138 Central Bass Strait, 32 km WSW of Settlement Point, Flinders Island (40°9.0'S, 147°31.8'E), 51 metres, coarse sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 6 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 40°9.0'S, 147°31.8'E to 40°8.8'S, 147°29.3'E, 51 to 52 metres).

BSS 139 Eastern Bass Strait, 35 km NNE of Eddystone Point, Tasmania (40°43.8'S, 148°32.7'E), 55 metres, medium sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 7 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 40°43.8'S, 148°32.7'E to 40°43.8'S, 148°34.4'E, 55 to 59 metres).

BSS 140 Eastern Bass Strait, 39 km NNE of Eddystone Point, Tasmania (40°43.9'S, 148°37.5'E), 70 metres, fine sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 7 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 40°43.9'S, 148°37.5'E to 40°43.8'S, 148°38.6'E), 70 metres.

BSS 141 Eastern Bass Strait, 63 km E of North Point, Flinders Island (39°45.2'S, 148°40.6'E), 122 metres, muddy sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 7 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 39°45.2'S, 148°40.6'E to 39°47.8'S, 148°37.4'E, 122 to 112 metres).

BSS 142 Eastern Bass Strait, 46 km ENE of North Point, Flinders Island (39°31.4'S, 148°25.0'E), 37 metres, medium sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 8 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 39°31.4'S, 148°25.0'E to 39°34.3'S, 148°24.1'E), 37 to 31 metres.

BSS 143 Eastern Bass Strait, 87 km NNE of North Point, Flinders Island (39°3.9'S, 148°29.4'E), 108 metres, fine sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 8 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 39°3.9'S, 148°29.4'E to 39°4.6'S, 148°32.0'E, 108 to 120 metres).

BSS 144 Eastern Bass Strait, 89 km NNE of North Point, Flinders Island (39°4.3'S, 148°33.5'E), 130 metres, muddy sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 8 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 39°4.3'S, 148°33.5'E to 39°4.6'S, 148°32.5'E, 130 to 238 metres).

BSS 145 Eastern Bass Strait, 110 km NNE of North Point, Flinders Island (38°53.0'S, 148°24.2'E), 126 metres, fine sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 8 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 38°53.0'S, 148°24.2'E to 39°00.0'S, 148°26.8'E, 126 to 100 metres).

BSS 146 Eastern Bass Strait, 27 km SE of Cape Conran, Victoria (38°0.3'S, 148°55.7'E), 113 metres, medium sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 9 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 38°0.3'S, 148°55.7'E to 38°0.3'S, 148°58.6'E, 113 to 119 metres).

BSS 147 Eastern Bass Strait, 16 km SW of Point Hicks, Victoria (37°55.3'S, 149°10.3'E), 113 metres, medium sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 9 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 37°55.3'S, 149°10.3'E to 37°55.4'S, 149°15.1'E, 113 to 119 metres).

BSS 148 Eastern Bass Strait, 26 km SE of Point Hicks, Victoria (37°57.9'S, 149°16.6'E), 134 metres, muddy sand, Gomon, M. F., Poore, G., Lu, C. C., 9 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 37°57.9'S, 149°30.5'E to 38°4.3'S, 149°34.5'E, 134 to 143 metres).

BSS 149 Eastern Bass Strait, 35 km S of Point Hicks, Victoria (38°7.8'S, 149°16.6'E), 150 metres, muddy sand, Gomon, M. F., Poore, G., Lu, C. C., 9 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 38°7.8'S, 149°16.6'E to 38°2.0'S, 149°11.1'E, 150 to 119 metres).

BSS 150 Eastern Bass Strait, 90 km N of North Point, Flinders Island (38°53.5'S, 147°55.9'E), 71 metres, muddy sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 10 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 38°53.5'S, 147°55.9'E to 38°53.8'S, 147°56.8'E).

BSS 151 Central Bass Strait, 65 km SW of Cape Paterson, Victoria (39°6.2'S, 145°4.3'E), 69 metres, medium sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 11 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 39°6.2'S, 145°4.3'E to 39°5.5'S, 145°2.1'E, 69 to 68 metres).

BSS 152 Central Bass Strait, 82 km SW of Cape Liptrap, Victoria (39°6.8'S, 144°49.6'E), 65 metres, medium sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 11 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 39°6.8'S, 144°49.6'E to 39°5.9'S, 144°45.9'E, 65 to 68 metres).

BSS 153 Central Bass Strait, 64 km SSW of Cape Schanck, Victoria (39°0.8'S, 144°34.7'E), 67 metres, medium sand, M.F. Gomon, G.C.B. Poore and C.C. Lu, 11 Feb 1981, FRV "Hai Kung" (Cruise number 81-HK-1)

Samples taken: pipe dredge; BSS-T (otter trawl, 36 m headrope, 60 mm mesh cod end, from 39°0.8'S, 144°34.7'E to 38°54.6'S, 144°30.2'E, 67 to 77 metres).

BSS 154 Central Bass Strait, 6 km S of Cape Schanck, Victoria (38°33.6'S, 144°54.3'E), 55 metres, medium sand, R. Wilson, 12 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 38°33.4'S, 144°54.9'E), 55 metres.

BSS 155 Central Bass Strait, 38 km SW of Cape Paterson, Victoria (38°55.5'S, 145°17.0'E), 70 metres, fine sand, R. Wilson, 12 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 38°56.4'S, 145°16.6'E).

BSS 156 Central Bass Strait, 100 km SSE of Cape Liptrap, Victoria (39°45.9'S, 145°33.3'E), 74 metres, muddy fine sand, R. Wilson, 13 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 39°45.9'S, 145°33.5'E).

BSS 157 Central Bass Strait, 65 km ENE of Cape Rochon, Three Hummock Island, Tasmania (40°10.9'S, 145°44.3'E), 75 metres, shelly sand, R. Wilson, 13 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 158 Central Bass Strait, 66 km S of Rodondo Island, Victoria (39°49.5'S, 146°18.5'E), 82 metres, sand-silt-mud, R. Wilson, 13 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 39°48.6'S, 146°18.8'E).

BSS 159 Central Bass Strait, 57 km S of Rodondo Island, Victoria (39°43.5'S, 146°18.8'E), 80 metres, muddy shell, R. Wilson, 13 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 39°46.0'S, 146°18.0'E).

BSS 160 Central Bass Strait, 25 km S of Deal Island, Tasmania (39°43.7'S, 147°19.6'E), 59 metres, muddy shell, R. Wilson, 13 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 161 Central Bass Strait, 33 km S of Deal Island, Tasmania (39°48.3'S, 147°19.2'E), 60 metres, muddy sand, R. Wilson, 14 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 39°47.3'S, 147°19.3'E).

BSS 162 Central Bass Strait, 25 km SW of Cape Frankland, Flinders Island (40°09.2'S, 147°31.9'E), 51 metres, shelly sand, R. Wilson, 14 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 40°09.4'S, 147°32.6'E).

BSS 163 Eastern Bass Strait, 24 km NNE of Eddystone Point, Tasmania (40°43.9'S, 148°32.5'E), 56 metres, muddy sand, R. Wilson, 14 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 164 Eastern Bass Strait, 37 km NNE of Eddystone Point, Tasmania (40°43.8'S, 148°37.2'E), 67 metres, muddy sand, R. Wilson, 14 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 40°40.7'S, 148°36.9'E).

BSS 165 Eastern Bass Strait, 42 km SW of Babel Island, Tasmania (40°14.4'S, 148°40.0'E), 60 metres, fine sand, R. Wilson, 14 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 40°13.8'S, 148°39.6'E).

BSS 166 Eastern Bass Strait, 20 km SSW of Babel Island, Tasmania (40°06.8'S, 148°24.3'E), 22 metres, coarse shell, R. Wilson, 14 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled and Agassiz trawl, 40°06.2'S, 148°25.0'E).

BSS 167 Eastern Bass Strait, 63 km E of North Point, Flinders Island (39°44.8'S, 148°40.6'E), 124 metres, muddy sand, R. Wilson, 14 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 168 Eastern Bass Strait, 45 km NE of North Point, Flinders Island (39°31.2'S, 148°24.4'E), 40 metres, medium sand, R. Wilson, 15 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 39°31.5'S, 148°24.5'E).

BSS 169 Eastern Bass Strait, 85 km NE of North Point, Flinders Island (39°02.4'S, 148°30.6'E), 120 metres, muddy sand, R. Wilson, 15 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 170 Eastern Bass Strait, 100 km NE of North Point, Flinders Island (31°51.8'S, 148°26.5'E), 130 metres, fine sand, R. Wilson, 15 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 31°52.6'S, 148°25.2'E, 140 metres).

BSS 171 Eastern Bass Strait, 94 km N of North Point, Flinders Island (38°53.7'S, 147°55.2'E), 71 metres, medium sand, R. Wilson, 17 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled and Agassiz trawl).

BSS 172 Eastern Bass Strait, 70 km N of North Point, Flinders Island (39°03.9'S, 147°55.4'E), 62 metres, shelly sand, R. Wilson, 17 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 39°05.2'S, 147°56.6'E).

BSS 173 Eastern Bass Strait, 30 km N of North Point, Flinders Island (39°26.3'S, 147°48.7'E), 49 metres, medium sand, R. Wilson, 17 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 174 Eastern Bass Strait, 25 km NE of Deal Island, Tasmania (39°14.8'S, 147°31.5'E), 57 metres, medium sand, R. Wilson, 18 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled, 39°16.8'S, 147°33.2'E).

BSS 175 Eastern Bass Strait, 40 km N of Deal Island, Tasmania (39°05.8'S, 147°26.2'E), 59 metres, medium sand, R. Wilson, 18 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 176 Eastern Bass Strait, 50 km SE of Port Albert, Victoria (38°54.3'S, 147°13.4'E), 58 metres, coarse shell, R. Wilson, 18 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 177 Eastern Bass Strait, 43 km SE of Port Albert, Victoria (38°53.7'S, 147°06.5'E), 58 metres, coarse shell, R. Wilson, 18 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled and Agassiz trawl).

BSS 178 Eastern Bass Strait, 20 km SE of Port Albert, Victoria (38°43.4'S, 146°56.9'E), 26 metres, no sediment data recorded, R. Wilson, 18 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled and Agassiz trawl).

BSS 179 Eastern Bass Strait, 15 km E of Cape Wellington, Wilsons Promontory, Victoria (39°03.2'S, 146°39.5'E), 55 metres, muddy fine sand, R. Wilson, 18 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-S (WHOI epibenthic sled and pipe dredge).

BSS 180 Central Bass Strait, 8 km S of South East Point, Wilsons Promontory, Victoria (39°12.9'S, 146°27.3'E), 65 metres, medium sand, R. Wilson, 18 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-S (WHOI epibenthic sled and pipe dredge).

BSS 181 Central Bass Strait, 26 km SE of Aireys Inlet, Victoria (38°39.8'S, 144°18.2'E), 79 metres, very fine sand, R. Wilson, 19 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled and Agassiz trawl).

BSS 182 Central Bass Strait, 25 km S of Aireys Inlet, Victoria (38°44.6'S, 144°09.0'E), 77 metres, fine sand, R. Wilson, 19 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 183 Western Bass Strait, 35 km SSW of Cape Otway, Victoria (39°07.0'S, 143°14.6'E), 84 metres, coarse sand, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 184 Western Bass Strait, 10 km W of Cape Otway, Victoria (39°49.0'S, 143°24.0'E), 56 metres, fine sand, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 185 Western Bass Strait, 5 km S of Point Reginald, Victoria (38°48.0'S, 143°14.5'E), 47 metres, hard rocky bottom, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (rock dredge).

BSS 186 Western Bass Strait, 15 km SW of Point Reginald, Victoria (38°50.0'S, 143°07.5'E), 69 metres, fine sand, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (rock dredge).

BSS 187 Western Bass Strait, 15 km S of Port Fairy, Victoria (38°32.0'S, 142°28.6'E), 52 metres, medium sand, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 188 Western Bass Strait, 30 km SSW of Warrnambool, Victoria (38°38.2'S, 142°35.0'E), 59 metres, sediment data not recorded, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-S (WHOI epibenthic sled).

BSS 189 Western Bass Strait, 40 km SSW of Warrnambool, Victoria (38°42.8'S, 142°35.6'E), 69 metres, coarse sand, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-S (WHOI epibenthic sled and pipe dredge).

BSS 190 Western Bass Strait, 50 km SSW of Warrnambool, Victoria (38°49.5'S, 142°35.4'E), 89 metres, coarse sand, R. Wilson, 21 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-S (pipe dredge and rock dredge).

BSS 191 Western Bass Strait, 60 km SW of Cape Otway, Victoria (39°06.3'S, 142°55.6'E), 84 metres, fine shell, R. Wilson, 21 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-S (pipe dredge and rock dredge).

BSS 192 Western Bass Strait, 44 km SW of Cape Otway, Victoria (39°06.3'S, 142°55.6'E), 81 metres, medium sand, R. Wilson, 21 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-S (pipe dredge and rock dredge).

BSS 193 Western Bass Strait, 55 km SW of Cape Otway, Victoria (39°16.7'S, 143°06.7'E), 95 metres, medium sand, R. Wilson, 21 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-S (rock dredge).

BSS 194 Western Bass Strait, 70 km SW of Cape Otway, Victoria (39°26.3'S, 143°06.8'E), 115 metres, sand, R. Wilson, 21 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 195 Western Bass Strait, 70 km W of Cape Farewell, King Island (39°38.2'S, 143°07.2'E), 127 metres, sand, R. Wilson, 21 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 196 Western Bass Strait, 6 km W of Currie, King Island (39°54.7'S, 143°43.4'E), 49 metres, coarse sand, R. Wilson, 21 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (pipe dredge 39°55.8'S, 143°46.4'E and rock dredge 39°55.5'S, 143°47.5'E).

BSS 197 Western Bass Strait, 4 km SSW of Currie, King Island (40°00.7'S, 143°49.9'E), 46 metres, fine sand, R. Wilson, 21 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled and rock dredge).

BSS 198 Western Bass Strait, 36 km SSW of Stokes Point, King Island (40°26.7'S, 143°41.4'E), 85 metres, medium sand, R. Wilson, 22 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (rock dredge).

BSS 199 Western Bass Strait, 20 km SSW of Stokes Point, King Island (40°19.5'S, 143°48.8'E), 71 metres, sandy shell, R. Wilson, 22 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (rock dredge).

BSS 200 Central Bass Strait, 20 km NNE of Bold Head, King Island (40°00.0'S, 144°20.9'E), 48 metres, coarse sand, R. Wilson, 22 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (rock dredge).

BSS 201 Central Bass Strait, 65 km S of Cape Schanck, Victoria (39°08.3'S, 144°43.9'E), 66 metres, coarse sand, R. Wilson, 23 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 202 60 km SW of Cape Schanck, Victoria (39°00.2'S, 144°33.9'E), 74 metres, sandy shell, R. Wilson, 23 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 203 Central Bass Strait, 44 km NE of Cape Wickham, King Island (39°22.0'S, 144°18.3'E), 60 metres, coarse sand, R. Wilson, 23 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (rock dredge).

BSS 204 Central Bass Strait, 35 km NNE of Cape Wickham, King Island (39°16.0'S, 144°05.4'E), 82 metres, sandy shell, R. Wilson, 23 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (rock dredge).

BSS 205 Central Bass Strait, 35 km N of Cape Wickham, King Island (39°13.6'S, 143°55.6'E), 85 metres, fine sand, R. Wilson, 23 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: BSS-G (Smith-McIntyre grab); BSS-S (WHOI epibenthic sled).

BSS 206 Eastern Bass Strait, 19 km E of Lake Tyers Entrance, Victoria (37°50.5'S, 148°16.0'E), 26 metres, coarse sand, M. Gomon and R. Wilson, 30 Jul 1983, FV "Silver Gull" (Cruise number 83-SG-1)

Samples taken: BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 207 Eastern Bass Strait, 28 km SSW of Marlo, Victoria (37°59.0'S, 148°27.0'E), 51 metres, muddy sand and fine shell, M. Gomon and R. Wilson, 30 Jul 1983, FV "Silver Gull" (Cruise number 83-SG-1)

Samples taken: BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 208 Eastern Bass Strait, 6 km WSW of Cape Conran, Victoria (37°50.0'S, 148°40.0'E), 26 metres, medium sand, M. Gomon and R. Wilson, 30 Jul 1983, FV "Silver Gull" (Cruise number 83-SG-1)

Samples taken: BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 209 Eastern Bass Strait, 40 km SSW of Lakes Entrance, Victoria (38°18.0'S, 147°37.0'E), 55 metres, muddy fine shell, M. Gomon and R. Wilson, 31 Jul 1983, FV "Silver Gull" (Cruise number 83-SG-1)

Samples taken: BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 210 Eastern Bass Strait, 42 km SSW of Lakes Entrance, Victoria (38°18.5'S, 147°37.5'E), 46 metres, muddy fine shell, M. Gomon and R. Wilson, 31 Jul 1983, FV "Silver Gull" (Cruise number 83-SG-1)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 211 Eastern Bass Strait, 46 km SW of Lakes Entrance, Victoria (38°17.0'S, 147°29.0'E), 29 to 31 metres, no sediment sample, M. Gomon and R. Wilson, 31 Jul 1983, FV "Silver Gull" (Cruise number 83-SG-1)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 212 Eastern Bass Strait, 50 km SW of Lakes Entrance, Victoria (38°15.0'S, 147°22.5'E), 16 metres, sand with limestone reef outcrops, M. Gomon and R. Wilson, 31 Jul 1983, FV "Silver Gull" (Cruise number 83-SG-1)

Samples taken: BSS-S (WHOI epibenthic sled); BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 213 Eastern Bass Strait, 24 km SW of Lakes Entrance, Victoria (38°03'S, 147°50'E), 45 metres, no sediment sample, M. Gomon and R. Wilson, 1 Oct 1983, FV "Silver Gull" (Cruise number 83-SG-2)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 214 Eastern Bass Strait, 18 km NNE of Deal Island, Tasmania (39°19'S, 147°27'E), 63 metres, clean shell rubble, M. Gomon. F., Wilson, R., 1 Oct 1983, FV "Silver Gull" (Cruise number 83-SG-2)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 215 Eastern Bass Strait, 40 km NNE of Deal Island, Tasmania (39°06'S, 147°26'E), 59 metres, clean shell rubble, M. Gomon. F., Wilson, R., 2 Oct 1983, FV "Silver Gull" (Cruise number 83-SG-2)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 216 Eastern Bass Strait, 37 km S of Lake Tyers Entrance, Victoria (38°12'S, 148°06'E), 56 metres, clean shell rubble, M. Gomon. F., Wilson, R., 3 Oct 1983, FV "Silver Gull" (Cruise number 83-SG-2)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 217 Eastern Bass Strait, 34 km S of Lake Tyers Entrance, Victoria (38°11'S, 148°04'E), 56 metres, clean shell rubble, M. Gomon and R. Wilson, 3 Oct 1983, FV "Silver Gull" (Cruise number 83-SG-2)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 218 Eastern Bass Strait, 30 km S of Lake Tyers Entrance, Victoria (38°06'S, 148°03'E), 50 metres, no sediment sample, M. Gomon and R. Wilson, 3 Oct 1983, FV "Silver Gull" (Cruise number 83-SG-2)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 219 Eastern Bass Strait, 12 km SSE of Lake Tyers Entrance, Victoria (37°57'S, 148°09'E), 43 metres, no sediment sample, M. Gomon and R. Wilson, 3 Oct 1983, FV "Silver Gull" (Cruise number 83-SG-2)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

BSS 220 Eastern Bass Strait, 7 km ESE of Lakes Entrance, Victoria (37°54'S, 148°04'E), 23 metres, sand, M. Gomon and R. Wilson, 3 Oct 1983, FV "Silver Gull" (Cruise number 83-SG-2)

Samples taken: BSS-T (otter trawl, 4.9 m headrope, 12 mm mesh cod end).

Part 2. BSS-Q stations, NZOI numbers, 1981

BSS-Q 630 Eastern Bass Strait, slope, 116 km S of Cape Conran, Victoria (38°47.1'S, 148°32.9'E), 1700 to 1600 metres, R. Wilson, 15 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: rock dredge.

BSS-Q 631 Eastern Bass Strait, slope, 85 km SSW of Cape Conran, Victoria (38°35.1'S, 148°36.8'E), 1120 metres, sandy mud, R. Wilson, 15 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 632 Eastern Bass Strait, slope, 47 km S of Cape Conran, Victoria (38°24.5'S, 148°42.1'E), 1200 metres, sand-silt-clay, R. Wilson, 15 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 633 Eastern Bass Strait, slope, 70 km SSE of Cape Conran, Victoria (38°27.8'S, 148°53.6'E), 2350 metres, mud, R. Wilson, 15 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 634 Eastern Bass Strait, slope, 98 km S of Cape Conran, Victoria (38°42.3'S, 148°48.0'E), 2510 metres, mud, R. Wilson, 16 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 635 Eastern Bass Strait, slope, 121 km S of Cape Conran, Victoria (38°55.6'S, 148°46.4'E), 1730 metres, silty clay, R. Wilson, 16 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 636 Eastern Bass Strait, slope, 112 km SSE of Cape Conran, Victoria (38°49.0'S, 149°00.9'E), 2450 metres, mud, R. Wilson, 16 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 637 Eastern Bass Strait, slope, 71 km SSE of Cape Conran, Victoria (38°24.5'S, 149°09.5'E), 1575 metres, silty clay, R. Wilson, 16 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 638 Eastern Bass Strait, slope, 102 km SE of Cape Conran, Victoria (38°29.5'S, 149°32.4'E), 1630 metres, clayey sand, R. Wilson, 16 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 639 Eastern Bass Strait, slope, 130 km SSE of Cape Conran, Victoria (38°54.5'S, 149°24.1'E), 2280 metres, sand-silt-clay, R. Wilson, 16 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 640 Eastern Bass Strait, slope, 118 km NE of North Point, Flinders Island (39°09.0'S, 149°06.9'E), 1174 metres, sand-silt-clay, R. Wilson, 17 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)

Samples taken: pipe dredge.

BSS-Q 641 Eastern Bass Strait, slope, 110 km SSE of Cape Conran, Victoria (38°46.0'S, 148°34.8'E), 1750 to 1500 metres, no sediment sample, R. Wilson, 17 Nov 1981, FRV "Tangaroa" (Cruise number 81-T-1)
Samples taken: rock dredge.

BSS-Q 654 Central Bass Strait, 30 km ESE of Cape Otway, Victoria (38°56.4'S, 143°51.0'E), 79 metres, fine sand, R. Wilson, 19 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)
Samples taken: Smith-McIntyre Grab; WHOI epibenthic sled.

BSS-Q 655 Western Bass Strait, 30 km S of Cape Otway, Victoria (39°06.0'S, 143°35.9'E), 94 metres, medium sand, R. Wilson, 19 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)
Samples taken: Smith-McIntyre grab; WHOI epibenthic sled.

BSS-Q 656 Western Bass Strait, 30 km S of Cape Otway, Victoria (39°06.8'S, 143°29.2'E), 92 metres, fine sand, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)
Samples taken: Smith-McIntyre grab; WHOI epibenthic sled.

BSS-Q 657 Western Bass Strait, 25 km SW of Cape Otway, Victoria (39°00.7'S, 143°23.5'E), 83 metres, sandy shell, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)
Samples taken: Smith-McIntyre grab; WHOI epibenthic sled.

BSS-Q 659 Western Bass Strait, 30 km SW of Cape Otway, Victoria (39°01.0'S, 143°15.4'E), 82 metres, fine sand, R. Wilson, 20 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)
Samples taken: Smith-McIntyre grab; WHOI epibenthic sled.

BSS-Q 682 Western Bass Strait, 30 km S of Cape Otway, Victoria (39°06.8'S, 143°37.6'E), 92 metres, coarse sand, R. Wilson, 23 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)
Samples taken: Smith-McIntyre grab; rock dredge.

BSS-Q 683 Western Bass Strait, 30 km SSW of Cape Otway, Victoria (39°05.8'S, 143°31.3'E), 90 metres, medium sand, R. Wilson, 23 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)
Samples taken: Smith-McIntyre grab; rock dredge.

BSS-Q 684 Western Bass Strait, 15 km S of Cape Otway, Victoria (38°59.8'S, 143°30.5'E), 85 metres, sandy coarse shell, R. Wilson, 23 Nov 1981, RV "Tangaroa" (Cruise number 81-T-1)
Samples taken: Smith-McIntyre grab; rock dredge.

Part 3. S05/84 stations, CSIRO numbers, 1984

S05/84/1 Tasman Sea, 15 km E of Mistaken Cape, Maria Island, Tasmania (42°37'S, 148°20'E), 102 metres, R. Wilson, 9 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/5 Tasman Sea, 20 km E of Falmouth, Tasmania (41°32.9'S, 148°35.0'E), 122 metres, R. Wilson, 10 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/9 Eastern Bass Strait, 7 km E of Babel Island, Tasmania (39°57'S, 148°25'E), 40 metres, R. Wilson, 10 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/10 Eastern Bass Strait, 10 km SE of Babel Island, Tasmania (39°59'S, 148°24'E), 30 metres, R. Wilson, 11 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/15 Tasman Sea, 55 km E of Babel Island, Tasmania (40°0.00'S, 148°58.00'E), 1130 metres, R. Wilson, 11 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/16 Eastern Bass Strait, slope, 85 km NE of North Point, Flinders Island (39°21.30'S, 148°46.50'E to 39°19'S, 148°45'E), 496 to 478 metres, R. Wilson, 12 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/17 Eastern Bass Strait, slope, 90 km NE of North Point, Flinders Island (39°11'S, 148°42'E to 39°8'S, 148°41'E), 452 to 260 metres, R. Wilson, 12 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/18 Eastern Bass Strait, slope, 100 km NNE of North Point, Flinders Island (39°01'S, 148°40'E to 39°05'S, 148°42'E), 660 to 565 metres, R. Wilson, 12 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/19 Eastern Bass Strait, slope, 85 km NE of North Point, Flinders Island (39°16.2'S, 148°44.1'E to 39°19'S, 148°46'E), 660 metres, R. Wilson, 13 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/21 Eastern Bass Strait, slope, 96 km NNE of North Point, Flinders Island (39°03.9'S, 148°39.0'E to 39°01'S, 148°37'E), 432 to 460 metres, R. Wilson, 13 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/22 Eastern Bass Strait, slope, 103 km N of Babel Island, Tasmania (39°00.1'S, 148°24.2'E), 90 metres, R. Wilson, 13 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/23 Tasman Sea, eastern slope, 25 km SE of Gabo Island, Victoria (37°45.4'S, 150°10.4'E), 304 metres, R. Wilson, 14 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/25 Tasman Sea, eastern slope, 30 km SE of Gabo Island, Victoria (37°40.9'S, 150°17.7'E to 37°38'S, 150°19'E), 636 to 640 metres, R. Wilson, 14 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/26 Tasman Sea, eastern slope, 28 km SE of Gabo Island, Victoria (37°37.0'S, 150°16.7'E to 37°40'S, 150°15'E), 436 to 440 metres, R. Wilson, 14 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/27 Tasman Sea, eastern slope, 50 km SSE of Gabo Island, Victoria (37°59.4'S, 150°05.4'E to 38°02'S 150°02'E), 452 to 460 metres, R. Wilson, 14 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/28 Tasman Sea, eastern slope, 62 km S of Gabo Island, Victoria (38°07.9'S, 149°59.1'E to 39°03'S, 150°01'E), 656 to 648 metres, R. Wilson, 14 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/29 Tasman Sea, eastern slope, 70 km S of Gabo Island, Victoria (38°10.3'S, 149°57.2'E), 592 metres, R. Wilson, 14 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/30 Tasman Sea, eastern slope, 50 km S of Mallacoota, Victoria (38°06.2'S, 149°45.5'E), 188 metres, R. Wilson, 14 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/31 Tasman Sea, eastern slope, 70 km S of Gabo Island, Victoria (38°10.8'S, 149°57.5'E to 38°12'S, 149°54'E), 620 to 632 metres, R. Wilson, 15 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/33 Tasman Sea, eastern slope, 66 km S of Gabo Island, Victoria (38°10.3'S, 149°52.0'E to 38°12'S, 149°49'E), 442 to 444 metres, R. Wilson, 15 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/34 Eastern Bass Strait, slope, 48 km south of Point Hicks, Victoria (38°15.5'S, 149°18.7'E to 38°07'S, 149°16'E), 446 to 408 metres, R. Wilson, 15 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/36 Central Bass Strait, 3 km E of Cape Rochon, Three Hummock Island, Tasmania (40°23'S, 145°03'E), 44 metres, R. Wilson, 17 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled. (All material from this station to South Australian Museum)

S05/84/40 Southern Ocean, 70 km W of West Point, Tasmania (40°57'S, 143°47'E to 40°56'S, 143°45'E), 550 to 548 metres, R. Wilson, 18 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/45 Southern Ocean, 46 km W of Richardson Point, west coast of Tasmania (41°14.00'S, 144°6.80'E to 41°16'S, 144°10'E), 520 to 552 metres, R. Wilson, 19 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Engel's trawl.

S05/84/51 Southern Ocean, 48 km W of Richardson Point, west coast of Tasmania (41°15.0'S, 144°08.0'E to 41°17'S, 144°10'E), 520 to 480 metres, R. Wilson, 20 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: Frank and Bryce trawl.

S05/84/53 Southern Ocean, 66 km W of Zeehan, west coast of Tasmania (41°50.2'S, 144°33.2'E), 420 metres, R. Wilson, 20 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/54 Southern Ocean, 30 km NNW of Cape Sorell, west coast of Tasmania (42°10.9'S, 144°48.9'E), 160 metres, R. Wilson, 20 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/60 Southern Ocean, 25 km W of Port Davey, west coast of Tasmania (43°25.3'S, 145°39.8'E), 160 metres, R. Wilson, 21 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

S05/84/64 Southern Ocean, 15 km E of Cape Connella, southern Tasmania (43°24.6'S, 147°32.5'E), 82 metres, R. Wilson, 22 Oct 1984, FRV "Soela", (Cruise number S05/84/1)
Samples taken: WHOI epibenthic sled.

Appendix 1. Sediment characteristics from data supplied by the Geology Department, University of Melbourne. Table of values of mean and standard deviation (sorting coefficient), in phi units; percentages of particles of four size grades: gravel (<-1 phi), sand (-1 to 4 phi), silt (4 to 8 phi), clay (>8 phi); and percentage of carbonate sediment by weight.

Particle size			Percentage											
Station	mean	s.d.	gravel	sand	silt	clay	car- bonate							
47	1.1	0.7		100			73	131	3.1	0.5		100		99
48	0.6	0.9	12	88				132	6.4	4.0		42	17	98
49				98	2		50	133						98
50	1.7	0.6		100				134	5.7	4.1	1	53	7	38
51	0.8	0.4		100				135	6.1	4.1		49	12	39
52	-0.1	1.0	36	64			72	136	6.4	4.1		41	15	44
53	1.2	0.4		100			45	137	2.8	0.0		100		99
54	-0.2	0.3	9	91			70	138	0.3	0.9	19	79	1	1
55	0.8	0.5		100			93	139	1.3	1.0	1	97		2
56	1.1	0.4		100				140	1.5	0.6		100		93
57	0.3	0.6		100			97	141	5.6	3.8		58	13	29
58	0.5	0.6		100			92	142	1.2	0.4		100		28
59	0.0	0.6		100			89	143	2.3	4.0		88	3	9
60	1.3	0.5		100			100	144	4.9	3.4		77	2	21
61	0.8	0.6		100				145	2.6	3.9		90		10
62	0.9	0.7		100				146	1.4	0.7		100		25
63	0.2	0.8		100				147	1.2	4.6	5	83	3	8
64	0.3	0.6		100				148	5.8	3.7		59	8	33
65	3.8	3.1	6	62	16	16		149	5.8	4.0		60	1	39
66	8.7	3.5		8	31	61		150	5.1	3.5		68	10	22
67	1.4	0.6		100				151	1.5	0.9	3	94	1	2
68	0.6	2.2	24	67	4	5	100	152	1.1	0.6		100		99
69	0.7	0.6		100			98	153	0.9	1.0	8	90	1	1
70	1.2	1.0		100			100	154	0.8	0.5		98	1	1
71	1.4	0.5		100			100	155	2.3	0.8		96	2	2
72	0.5	0.3		100			100	156	3.5	2.1		83	8	9
73	1.5	0.7		100			100	157	5.3	3.5		55	22	23
74	0.5	0.6		100			92	158	6.2	3.5		48	26	26
75	0.9	0.6		100			99	165	2.4	3.6		92	4	4
76	0.3	0.6		100			90	167	4.9	3.1		64	17	19
77	0.7	0.6		100			100	168	1.4	0.5		8	1	1
78	1.2	0.6		100			100	169	4.3	2.6		73	13	14
79	0.8	2.3	16	75	4	5		170	2.2	3.5		93	3	3
80	1.4	0.5		100				171	1.9	0.5		98	1	1
81	0.7	0.4		100				173	1.1	0.5		98	1	1
82	1.5	0.5		100				174	1.3	0.7		96	2	2
83	1.5	0.2		100				175	1.2	0.4		100		100
84	3.4	5.2	11	67	7	15	100	179	2.4	2.0		88	6	6
85	0.8	4.8	8	81	1	10		180	1.2	0.5		96	2	2
87	0.6	0.8		100				181	2.8	0.6		100		98
88	0.3	0.2		100			100	183	0.7	0.4		100		99
89	1.1	0.5		100			100	186	2.0	0.5		100		
90	1.4	0.5		100				187	1.2	0.7		100		90
95	-0.2	0.9	35	65				189	0.8	0.4		100		98
96	0.0	0.5		100				192	1.1	0.6		100		100
97	1.0	0.8		100				193	1.2	0.5		100		100
98			2	88		10		194	1.3	1.1		100		
99	1.3	1.4	3	91	3	3		195	1.7	0.7		100		
100	1.7	2.4		88	4	8		196	0.6	0.3		100		99
101	2.5	3.5		82	5	13		197	2.4	0.4		100		
103	0.7	0.8		100				198	1.2	0.3		100		100
104			13	41		46		200	0.8	0.4		100		20
105	5.9	4.2	6	38	23	33		201	1.0	0.6		100		95
106	3.6	3.0	2	76	10	12		203	0.9	0.4		100		100
118	2.0	0.5		100			96	Q632	5.4	3.3		52	24	24
119	2.2	0.5		100			99	Q635	8.4	3.2		11	42	47
120	1.9	0.5		100			90	Q637	8.0	3.2		12	44	44
121	1.9	0.3		100				Q638	4.2	2.4		76	11	13
122	0.8	0.3		100				Q639	7.2	3.7		25	37	38
								Q640	6.8	3.6		34	33	33
								Q654	2.2	0.6		100		90
								Q655	2.0	0.5		100		
								Q682	10.8	0.8		100		
								Q683	12.0	0.4		100		98

Cephalopods of Lizard Island, Great Barrier Reef, Australia

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Abstract. Roper, C.F.E. and Hochberg, F.G. (1987). Cephalopods of Lizard Island, Great Barrier Reef, Australia. *Occasional Papers from the Museum of Victoria* 3: 15-20.

A checklist is presented of 27 species of cephalopods collected at Lizard Island, North Queensland, Australia. Information on habitats and localities of the species also is included. Based on observations of live animals and systematic evaluation of specimens, the occurrence of *Octopus ornatus*, *Idiosepius pygmaeus*, *Sepiolo birostrata* and *S. trirostrata* in Australian waters is confirmed.

Introduction

While the Australian cephalopod fauna is known to be rich and varied (see Lu and Phillips, 1985), very little has been published concerning the cephalopods that inhabit the coastal and Great Barrier Reef waters of Queensland. Hedley (1906: 463) listed three species of cuttlefish based on a few cuttlebones from Mast Head Reef, Capricorn Group. Iredale (1926) described nine species and subspecies of cuttlefish solely on the basis of cuttlebones, also from the Capricorns. No cephalopods have been reported from Lizard Island which lies nearly 1200 km to the north of the Capricorn Group of islands. While the three species listed by Hedley are accepted species described from the HMS "Challenger" Expedition by Hoyle (1885) (*Sepia elliptica*—misidentified as *S. esculenta*, *S. cultrata*, and *S. pfefferi*), those described by Iredale are unrecognisable from the very brief descriptions or they are synonyms of known species.

With the establishment of a permanent research station on Lizard Island in 1974 it seemed appropriate to attempt to delineate the cephalopod fauna in the waters accessible to the station, so that potential researchers would know what species were available and the habitats in which they live.

This paper results from the participation of the first author in the International Workshop on Molluscs held at the Lizard Island Research Station on Lizard Island, North Queensland, Australia in December, 1975. A continental, granitic island about 30 km off the Queensland coast and 17 km inshore of the Great Barrier Reef, Lizard Island is located at 14°40'S, 145°28'E. Ponder (1979) presented information about the workshop and described the characteristics of Lizard Island.

The objective of participation in the workshop was to survey the cephalopod fauna taxonomically and to observe, so far as possible, live cephalopods in their habitat and in aquaria. Observations on colour and body patterns of several species are presented by Roper and Hochberg (1988).

This preliminary checklist of the cephalopods of Lizard Island and environs is based on three sources: a) primarily on collections made during the Molluscan Workshop in December, 1975; b) specimens collected during an Australian Museum Fish Department survey for fishes in November, 1975; and c) specimens in the Department of Malacology, Australian Museum, Sydney, many of which are cuttlebones collected on beaches in November and December 1974 during a malacological survey in preparation for the workshop the following year. A brief return visit to Lizard Island in December, 1986 (by CFER) provided additional records for several species as well as the first animal of *Sepia latimanus*, known previously only from stranded cuttlebones. The cephalopod collections in the Queensland Museum, Museum of Victoria, Tasmanian Museum, South Australian Museum and Western Australian Museum were also examined, but no additional records of Lizard Island cephalopods were found.

In order to assist researchers who wish to work on cephalopods, detailed habitat and collection data are listed, and localities are plotted on a map of Lizard Island (Fig. 1). The total of 27 species of cephalopods listed herein from Lizard Island is expected to increase as collecting is extended to less accessible habitats, especially on the windward side of the island.

Four species, *Octopus ornatus*, *Idiosepius pygmaeus*, *Sepiolo birostrata* and *Sepiolo trirostrata* are recorded in

the literature for the first time in Australian waters. The occurrence of the first two species is not surprising, as both are inhabitants of the Indo-Pacific region. *Octopus ornatus* occurs extensively in tropical waters from Hawaii throughout the Indo-Pacific islands to East Africa, and now in tropical Australia. Voss (1981) discussed the systematics and distribution of this vividly marked, white striped, reef octopus. The distribution of *Idiosepius pygmaeus* is recorded throughout Indonesia and the Philippines (Voss, 1963), so it is reasonable to expect its range extension into tropical Australian waters.

Sepioloidea birostrata previously has been recorded only from Japan (Sasaki, 1929) and *S. trirostrata* only from the Philippines (Voss, 1963). The Lizard Island specimens of these species were sent to Drs C.C. Lu and T. Okutani who are engaged in a revisionary study of the Australian Sepioloidea and who verified that these specimens were conspecific with material they have from other tropical Australian localities. Their study indicates that the Sepioloidea is both widely distributed and speciose in Australian waters (Lu and Okutani, in preparation).

Collections during the workshop were made in the intertidal zone (primarily during low tides at night), on the patch, fringing, and barrier reefs by skin and scuba diving, by night lighting with dipnet from a small boat, and by beach combing for stranded specimens, e.g., *Sepia* and *Metasepia* cuttlebones, *Nautilus* shells. Thirty-seven stations were occupied on Lizard Island for collection and observation during the workshop; of this total 21 were diving stations. Specimens were fixed in 8% buffered sea water formalin at the Lizard Island Research Station (fixation techniques are described in Roper and Sweeney (1983), then were transferred to 75% ethyl alcohol at the Australian Museum, Sydney. Cuttlebones from *Sepia* and *Metasepia* species and shells from *Nautilus* species are kept in the dry collections. Specimens of all species listed in this paper are archived in the Department of Invertebrate Zoology—Mollusks, National Museum of Natural History, Smithsonian Institution, Washington, D.C., or the Department of Malacology, Australian Museum, Sydney.

Checklist of cephalopods of Lizard Island.

Lu and Phillips (1985) published an annotated checklist of the cephalopods of Australia based on references in the literature and on collections in the Museum of Victoria, Melbourne. The reader is referred to this work as a source of information for synonyms of species listed here; additional references are given in Roper (1983). C.C. Lu and F.G. Hochberg currently are investigating the systematics and distribution of the octopods of eastern Australia. Their work will clarify the identification of octopods that occur on Lizard Island to an extent not possible in this checklist.

The following checklist should be regarded as preliminary in that it was not possible to explore all potential habitats on the island nor to determine if additional sources of material are housed in Australian institutes other than the museums in Sydney, Brisbane and Melbourne since examinations in 1976. We expect that a number of species will be added as collecting and systematic knowledge become more comprehensive.

Species are listed alphabetically within families, with author and date of original description. Records within species are ordered chronologically except in species of *Sepia* for which records of captured animals are listed before records of cuttlebones only. Locality of each collection is given as a CFER station number (details of station data are provided in a separate list), a place name or station number location from the Australian Museum Fish Department (e.g., LZ-75-26, listed separately) or N. Coleman, or a place name from the Department of Malacology (Australian Museum, Sydney) collections; localities are on or in the vicinity of Lizard Island (Fig. 1). Number of specimens is indicated, followed by the mantle length or range in mantle length (ML) in mm. Several species of *Sepia* are represented by cuttlebones only; size is given as cuttlebone length (CL) in mm. *Nautilus* shells were not measured.

Abbreviations for institutional catalogue or registration numbers are: AMS—Department of Malacology, The Australian Museum; USNM—Department of Invertebrate Zoology—Mollusks, National Museum of Natural History, Smithsonian Institution. The notation "(part)" following some AMS registration numbers indicates a complex or mixed lot that consists of specimens of more than one species. Species denoted with an asterisk (*) are those for which observations on live animals are presented in Roper and Hochberg (1988).

NAUTILIDAE

1. *Nautilus macromphalus* Sowerby, 1848

Coconut Beach, 1 broken, encrusted shell, 10 Dec 1974, coll. W. Ponder, P. Colman, I. Loch, AMS C99845.

CFER-36, 1 encrusted shell (drifted from New Caledonia?), USNM 816639.

2. *Nautilus pompilius* Linnaeus, 1758

Coconut Beach, 2 broken, encrusted shells, 10 Dec 1974, coll. W. Ponder, P. Colman, I. Loch, AMS C99846.

CFER-36, 5 shells (living specimens first reported by Saunders, 1981), USNM 816640.

Seaward of Carter Reef, off Lizard Is., 1 shell from mature male live-trapped at 300 m, 26 Jun 1985, coll. W.B. Saunders (see Saunders, 1986), AMS C148212.

3. *Nautilus stenomphalus* Sowerby, 1848

Seaward of Carter Reef, off Lizard Is., 1 shell of mature male from several specimens live-trapped at 300 m, 26 Jun 1985, coll. W.B. Saunders (see Saunders, 1986), AMS C148211.

SEPIIDAE

1. **Metasepia pfefferi* Hoyle, 1885

Watsons Bay, 16 m, sandy rubble, 1 spec., 24 mm ML, 10 Nov 1975, coll. N. Coleman, AMS C102484.

Watsons Beach, north end, 1 spec., 34 mm CL, 12 Dec 1975, coll. W. Ponder, C.F.E. Roper, I. Loch, AMS C104430 (part).

CFER-22, 1 spec., 22 mm ML, USNM 816621.

CFER-36, 1 cuttlebone, 20 mm CL, USNM 816634.

CFER-42, 1 spec., 13 mm ML, USNM 816621.

2. *Sepia apama* Gray, 1849

LZ-75-17, 1 spec., 62 mm ML, AMS C102664 (part).

Windy Beach, 1 spec., 41 mm CL, 4 Dec 1975, coll. W. Ponder, P. Colman, AMS C125668.

3. *Sepia elliptica* Hoyle, 1885

Northern beach on Palfrey Is., 1 spec., 97 mm CL, 3 Dec 1974, coll. W. Ponder, AMS C103582 (part).

Coconut Beach, 1 spec., 115 mm CL, 10 Dec 1974, coll. W. Ponder, P. Colman, I. Loch, AMS C99847 (part).

4. *Sepia latimanus* Quoy & Gaimard, 1832

Lagoon 0.5 km off Research Station, 1 spec., 75 mm ML, 28 Dec 1986, coll. C.F.E. Roper, C.T. Roper, E.C. Roper, USNM 816699.

Coconut Beach, 4 spec., 184-323 mm CL, 9 Dec 1975, coll. S. Slack-Smith, B. Wilson, AMS C102264.

Watsons Beach, north end, 2 spec., 212 and 280 mm CL, 12 Dec 1975, coll. W. Ponder, C.F.E. Roper, I. Loch, AMS C104430 (part).

Windy Beach, 6 spec., 133-311 mm CL, Nov.-Dec 1974, coll. I. Loch, P. Colman, W. Ponder, AMS C99644.

5. *Sepia mestus* Gray, 1849

(not *S. mestus* Iredale, 1926)

Eagle Cay, 5 m, coral bottom, 1 spec., 65 mm ML, 7 Nov 1975, coll. J. Paxton, AMS C102647.

Eagle Cay, 5 m, on reef, 1 spec., 24 mm ML, 7 Nov 1975, N. Coleman, AMS C102643.

LZ-75-17, 1 spec., 14 mm ML, AMS C102664 (part).

LZ-75-26, 2 spec., 38 and 17 mm ML, AMS C102648.

LZ-75-70, 1 spec., 77 mm ML, AMS C102650.

LZ-75-71, 1 spec., 25 mm ML, AMS C102660.

CFER-36 and 39, 15 cuttlebones, 11-72 mm CL, USNM 816637. Watsons Beach, north end, 1 spec., broken, 12 Dec 1975, coll. W. Ponder, C.F.E. Roper, I. Loch, AMS C104430 (part).

Windy Beach, 1 spec., 75 mm CL, Nov-Dec 1974, coll. I. Loch, P. Colman, W. Ponder, AMS C99644 (part).

6. *Sepia novaehollandiae* Hoyle, 1909

(*S. macandrewi* Iredale, 1926 cited as synonym by Adam, 1979).

Lagoon, Lizard Island Reef, 2 spec, 15 and 34 mm ML, 17 Nov 1975, coll. N. Coleman, AMS C102485.

CFER-36 and 39, 61 cuttlebones, 22-350 mm CL, USNM 816636.

CFER-44, 2 cuttlebones, 37-64+ mm CL, USNM 816641.

Northern beach on Palfrey Is., 1 spec., 97 mm CL, 3 Dec 1974, coll. W. Ponder AMS C103582 (part).

Coconut Beach, 1 spec., 117 mm CL, 10 Dec 1974, coll. W. Ponder, P. Colman, I. Loch, AMS C99847 (part).

7. **Sepia papuensis* Hoyle, 1885

(see Adam, 1979 for synonyms)

CFER-28, 1 spec., 33 mm ML, USNM 816619.

Lizard Is., 1 spec., 37 mm CL, Jul 1916, coll. C. Hedley, AMS C41677.

Northern beach on Palfrey Is. 1 spec., 58 mm CL, 3 Dec 1974, coll. W. Ponder, AMS C103582 (part).

Kapok Cove beach, North Point, 2 spec., 71 mm CL

and broken, 4 Dec 1974, coll. W. Ponder, AMS C103580 (part).

Coconut Beach, 5 spec., 56-84 mm CL, 10 Dec 1974, coll. W. Ponder, P. Colman, I. Loch, AMS C99848.

Windy Beach, 11 spec., 37-64 mm CL, Nov-Dec 1974, coll. I. Loch, P. Colman, W. Ponder, AMS C99644 (part).

CFER-36 and 39, 125+ cuttlebones, 9-67 mm CL, USNM 816635.

CFER-44, 11 cuttlebones, 25-65 mm CL, USNM 816642.

Watsons Beach, north end, 10 spec., 43-78 mm CL, 12 Dec 1975, coll. W. Ponder, C.F.E. Roper, I. Loch, AMS C104430 (part).

8. *Sepia pharaonis* Ehrenberg, 1831

Watsons Beach, north end, 9 spec., 116-195 mm CL, 12 Dec 1975, coll. W. Ponder, C.F.E. Roper, I. Loch, AMS C104430 (part).

9. *Sepia plangon* Gray, 1849

Watsons Bay, 16 m, sandy rubble, 2 spec., 23 and 16 mm ML, 10 Nov 1975, N. Coleman, AMS C102637.

Sandspit on north side Palfrey Is., 1 spec., 73 mm CL, 3 Dec 1974, coll. W. Ponder, P. Colman, AMS C103581.

Kapok Cove beach, North Point, 1 spec., 70 mm CL, 4 Dec 1974, coll. W. Ponder, AMS C103580 (part).

Windy Beach, 3 spec., 60-77 mm CL, Nov.-Dec 1974, coll. I. Loch, P. Colman, W. Ponder, AMS C99644 (part).

CFER-36 and 39, 31+ cuttlebones, 22-70 mm CL, USNM 816633.

CFER-44, 1 cuttlebone, 55+ mm CL, USNM 816643.

10. *Sepia smithi* Hoyle, 1885

(*S. esculenta* Hoyle, 1885 in part and *S. pageora* Iredale, 1954 cited as synonyms by Adam, 1979)

Watsons Bay, 16 m, sandy rubble, 1 spec., 53 mm ML, 10 Nov 1975, coll. N. Coleman, AMS C102644.

CFER-36, 2 cuttlebones, 77-88 mm CL, USNM 816632.

CFER-44, 1 cuttlebone, 110 mm CL, USNM 816644.

11. *Sepia* cf. *braggi* (Verco, 1907)

(Part of a species complex with narrow cuttlebones).

CFER-36 and 39, 50 cuttlebones, 29-44 mm CL, USNM 816622.

CFER-44, 1 cuttlebone, 41 mm CL, USNM 816631.

SEPIOLIDAE

1. *Sepiola birostrata* Sasaki, 1918

Lagoon, Lizard Island Reef, 1 spec., 9 mm ML, 17 Nov 1975, coll. N. Coleman, USNM 816626.

LZ-75-60, Coconut Beach, 1 spec., 9 mm ML, USNM 816625.

2. *Sepiola trirostrata* Voss, 1962

Watsons Bay, 16 m, sandy bottom, 1 spec., 10 mm ML, 10 Nov 1975, coll. N. Coleman, AMS C102639.

3. *Euprymna* cf. *stenodactyla* (Grant, 1833)

Palfrey Is., east edge, 0-3 m, 1 spec., 25 Jan. 1975, coll. D. Hoese, H. Larson, AMS C152357.

Watsons Bay, 16 m, sandy rubble, 1 spec., 20 mm ML, 10 Nov 1975, coll. N. Coleman, AMS C102638.

Watsons Bay, 9 m, algae, sand and rubble bottom, 1

spec., 27 Nov 1978, coll. D. Hoese, H. Larson, AMS C152356.

Lizard Is. Lagoon off South Is., 1 m, coral rubble and sand bottom, 2 spec., 28 Nov 1978, coll. D. Hoese, AMS C152355.

Yonge Reef, 1 mile north of platform, back reef of coral and sand, 1-15 m, 1 spec., 1 Dec 1978, coll. D. Hoese, AMS C152358.

Lizard Is. Lagoon, north of entrance, 1.5-6 m, 3 spec., 1.8-6.8 mm ML, 12 Dec 1978, coll. H. Larson, AMS C152354.

Lizard Is. area, 14°30'S, 145°42'E, surface plankton net, 1 spec., 8.5 mm ML, 7 Feb 1979, 2120 hr, coll. Australian Museum Party, AMS C152353.

IDIOSEPHIDAE

1. *Idiosepius pygmaeus* Steenstrup, 1881

Lagoon, Bommie No. 2, west side, 1-15 m, coral and sand, 1 spec., 5 mm ML, 17 Nov 1975, coll. J. Paxton, AMS C102658.

SPIRULIDAE

1. *Spirula spirula* (Linnaeus, 1758)

CFER-36 and 39, 17 shells (drifted in from open ocean), USNM 816638.

LOLIGINIDAE

1. *Photololigo edulis* (Hoyle, 1885)

CFER-33, 2 spec., 88 and 98 mm ML, USNM 816627.

2. *Sepioteuthis lessoniana* Lesson, 1830 (see Lu and Phillips, 1985)

CFER-33, 1 spec., 49 mm ML, USNM 816628.

CFER-40, egg capsules, probably of this species, USNM 816629.

Lagoon off Research Station, hand net, 1 m., 1 spec., 37 mm ML, 26 Dec 1986, coll. C.F.E. Roper, C.T. Roper, E.C. Roper, USNM 816700.

OMMASTREPHIDAE

1. *Symplectoteuthis luminosa* Sasaki, 1915

CFER-33a, 1 spec., 24 mm ML, USNM 816630.

OCTOPODIDAE

1. **Hapalochlaena cf. maculosa* Hoyle, 1883

Watsons Bay, 17 m, 1 spec., 19 mm ML, 8 Nov 1975, coll. N. Coleman, AMS C102486.

CFER-25, 1 spec., 26 mm ML, USNM 730599.

CFER-28, 1 spec., 26 mm ML, USNM 816623.

CFER-42, 2 spec, 11 and 17 mm ML, USNM 730598.

2. **Octopus cyanea* Gray, 1849

Watsons Bay, 16 m, sandy rubble, 2 spec., 23 and 27 mm ML, 10 Nov 1975, coll. N. Coleman, AMS C102640 and C102641.

CFER-18, 1 spec., 74 mm ML, USNM 816646.

CFER-33, 1 spec., 9 mm ML, USNM 816648.

CFER-50, 1 spec., 88 mm ML, USNM 816647.

Watsons Bay, 13 m, sandy silt bottom, 1 spec. living in beer bottle, 24 Dec 1986 (released 29 Dec), coll. C.T. Roper, E.C. Roper, C.F.E. Roper.

3. **Octopus ornatus* Gould, 1852

LZ-75-17, 1 spec., 50 mm ML, AMS C102664 (part). Lagoon, Lizard Island Reef, 1 spec. (released), Dec 1975. CFER-18, 10 spec. (2 released), 45-73 mm ML, USNM 816649.

CFER-20, 4 spec., 35-55 mm ML, USNM 816650.

Lizard Is., lagoon off Coconut Beach in night-lighted larval fish trap at surface, water depth 16 m, 1 spec., 26 Dec 1986, coll. Larval Fish Survey.

Lizard Is., reef flats off Research Station, minus tide, 0.2 m, 1 spec. (released), 29 Dec 1986, coll. C.F.E. Roper.

4. *Octopus* sp. A

Swains Reef, 8 m, on reef under rock, 1 spec., 20 mm ML, 14 Sep 1974, coll. N. Coleman, AMS C102649.

Yonge Reef, 10 m, 1 spec., 9 mm ML, 8 Nov 1975, coll. N. Coleman, AMS C102642 (part).

LZ-75-17, 2 spec., 14 and 22 mm ML, AMS C102664 (part).

Coconut Beach, 2-7 m, coral and sand, 1 spec., 21 mm ML, 24 Nov 1975, coll. J. Paxton, AMS C102651.

5. *Octopus* sp. B

Various localities, 3 spec., 6-25 mm ML.

Station and habitat information

Field data are listed for collections made on Lizard Island, Great Barrier Reef, north Queensland, Australia (14°40'S, 145°28'E) in 1975 by the senior author (CFER-) and by members of the Fish Department of the Australian Museum (LZ-75-). Additional station data, field and laboratory observations, diving logs and notes are maintained in the Division of Mollusks, National Museum of Natural History, Smithsonian Institution and in the Departments of Malacology and Fishes, Australian Museum, Sydney.

CFER-17. Casuarina Beach, patch reefs in front of Research Station; 2-3 m; afternoon; 1 Dec 1975; dive 13.

CFER-18. Exposed reef flats in front of Research Station; 0-0.5 m (minus tide); 0100-0330 hr (dark of moon); 2 Dec 1975. *Octopus ornatus*: 4 animals captured for observation; numerous additional animals observed in habitat.

CFER-19. Rocky Point, coral heads and rubble; 5-14 m; 1500-1600 hr; 2 Dec 1975; dive 15.

CFER-20. Casuarina Beach, exposed reef flats in front of Research Station; 0-0.5 m (minus tide); 0130-0330 hr (dark of moon); 3 Dec 1975. Small, shallow pools in rocky rubble and dead reefs. *Octopus cyanea*: 1 animal captured for observation; *O. ornatus*: 3 animals captured for observation; a number of additional *O. ornatus* observed in the field.

CFER-21. Between Research Station on Casuarina Beach and Freshwater Beach, on outcrop of granite boulders; intertidal; 1500 hr; 3 Dec 1975.

CFER-22. Watsons Bay; 11-13 m; 1445-1530 hr; 3 Dec 1975; dive 16. Bottom flat, finely sedimented and sandy, many holothurians. *Metasepia pfefferi*: 1 animal captured for observation.

CFER-23. Between Lizard Island and Palfrey Island, rotenone station; 2 m; 1645-1800 hr; 4 Dec 1975; dive 17.

Shallow coral reef, bottom sandy; rotenone around bases of coral heads.

CFER-24. Palfrey Island, off beach on north side; 3 m; 1045-1200 hr; 5 Dec 1975; dive 18. Bottom, sand/silt with scattered rocks.

CFER-25. Watsons Bay; 13-14 m; 1615-1705 hr; 5 Dec 1975; dive 19. Bottom, sand/silt, with scattered rubble; many black holothurians; patches of *Halimeda* and *Caulerpa*. *Hapalochlaena* cf. *maculosa*: 1 animal captured for observation.

CFER-26. Watsons Bay; 8 m; 1600 hr; 5 Dec 1975; dive 19. Single *Sepia ?papuensis* embryo in dead heart urchin test.

CFER-27. Casuarina Beach, patch reef in front of Research Station; 2-3 m; 0945-1100 hr; 6 Dec 1975; dive 20. *Octopus cyanea*: 1 animal, in situ observations.

CFER-28. Watsons Bay; 20-22 m; 1430-1510 hr; 6 Dec 1975; dive 21. Bottom, open, sand/silt with solitary corals and scattered *Halimeda* patches. *Sepia papuensis*: 1 animal captured for observation; *Hapalochlaena* cf. *maculosa*: 1 animal captured for observation.

CFER-32. Lagoon, Bommie No. 2; 5-14 m; 1445-1600 hr; 7 Dec 1975; dive 22. Reef face and rubble, around coral head.

CFER-33. Watsons Bay, surface night light; 0 m over a bottom depth of 16 m; 2230-0100 hr (dark, cloudy and rainy); 7 Dec 1975. *Photololigo edulis*, 2 animals collected; *Sepioteuthis lessoniana*, 1 animal collected; *Octopus* sp. (juvenile): 1 animal collected.

CFER-33a. Casuarina Beach, north end; 7 Dec 1975. *Symplectoteuthis luminosa*: 1 juvenile animal washed ashore, collected.

CFER-34. Yonge Reef, Great Barrier Reef, ocean side; 7-10 m; 1200-1230 hr; 9 Dec 1975; dive 23.

CFER-35. Yonge Reef, Great Barrier Reef, along inside of lead (channel), rotenone station; 2-12 m; 1300-1415 hr; 9 Dec 1975; dive 24.

CFER-36. Coconut Beach, windward side of Lizard Island; 9 Dec 1975. Stranded cuttlebones of: *Metasepia pfefferi*, 1 specimen; *Sepia braggi*, 50 specimens; *S. mestus*, 15 specimens; *S. novaehollandiae*, 61 specimens; *S. papuensis*, 125+ specimens; *S. plangon*, 31+ specimens; *S. smithi*, 2 specimens. Shells of: *Nautilus macromphalus*, 1 specimen; *N. pompilius*, 5 specimens; *Spirula spirula*, 17 specimens. All collected.

CFER-37. Casuarina Beach, reef flat in front of Research Station; 2-3 m; 1130-1245 hr; 10 Dec 1975; dive 25. *Octopus cyanea*: 1 specimen, in situ observations.

CFER-38. Coconut Beach, reef flat; 1-2 m; 1445-1600 hr; 11 Dec 1975; dive 26. Coral rubble and rock bottom.

CFER-39. Coconut Beach, windward side of island; 11 Dec 1975. Stranded cuttlebones of *Sepia* spp. (collected and combined with specimens from station 36; see above list).

CFER-40. Beach south of Pidgin Point; 1-2 m; 10 Dec 1975. *Sepioteuthis lessoniana*: egg masses; many observed on rocky bottom by S. Slack-Smith.

CFER-41. Reef between Palfrey Island and South Island; 2-3.5 m; 0945-1100 hr; 12 Dec 1975; dive 27.

CFER-42. Watsons Bay; 10-12 m; 1400-1515 hr; 12 Dec 1975; dive 28. Bottom, mixed sand/silt, dense patches of *Halimeda* and some *Caulerpa*. *Metasepia pfefferi*: 1 animal

captured; *Hapalochlaena* cf. *maculosa*: 2 animals captured.

CFER-43. Watsons Bay, reef in NE corner; 2-3.5 m; 1530-1645 hr; 12 Dec 1975; dive 29. Bottom, sandy with extensive staghorn coral and massive coral heads.

CFER-44. Watsons Beach; 12 Dec 1975. Stranded cuttlebones of: *Sepia* cf. *braggi*: 1 specimen; *S. novaehollandiae*: 2 specimens; *S. papuensis*: 11 specimens; *S. plangon*: 1 specimen; *S. smithi*: 1 specimen. All collected.

CFER-45. Watsons Bay, coral reef in NE corner; 2-3.5 m; 1100-1230 hr; 13 Dec 1975; dive 30.

CFER-46. South Island, east side, south face of coral reef; 2-10 m; 1530-1645 hr; 13 Dec 1975; dive 31.

CFER-47. Reef flats between Research Station and Rocky Point; 2-10 m; 13 Dec 1975. Assorted invertebrates collected from several dives.

CFER-48. South Island, beach on north side; 13 Dec 1975. Cuttlebones of *Sepia* spp collected.

CFER-49. Patch reef 0.5 km off Research Station; 2.5-4 m; 0930-1045 hr; 14 Dec 1975; dive 32.

CFER-50. Casuarina Beach, reef flats in front of Research Station; 2 m; 1115-1200 hr; 14 Dec 1975; dive 33. *Octopus cyanea*: 1 animal, in situ observations, then collected.

Department of Fishes station data

LZ-75-17. Yonge Reef, back of reef on reef flat, 14°36'S, 145°37'E; 10-13 m; 1030-1230 hr; 8 Nov 1975; rotenone station. *Sepia mestus*: 1 animal; *S. apama*: 1 animal; *Octopus ornatus*: 1 animal; *O. sp. A*: 2 animals. All collected.

LZ-75-26. Yonge Reef, north end in channel between Yonge and Carter Reefs, 14°35'S, 145°37'E; 1-18 m, 0945-1145 hr; 11 Nov 1975; coral with little sand, rotenone. *Sepia mestus*: 2 animals collected.

LZ-75-60. Coconut Beach, south end, 14°40'S, 145°28'E, 2-7 m, daytime; 24 Nov 1975, coral and sand. *Sepiolo birostrata*: 1 animal collected.

LZ-75-70. MacGillivray Reef/Cay, east of Lizard Is., windward side, 14°39'S, 145°29'E, 3-25 m; daytime; 27 Nov 1975; coral and sand. *Sepia mestus*: 1 animal collected.

LZ-75-71. MacGillivray Reef/Cay, east of Lizard Is., windward side, 14°39'S, 145°29'E, 1-3 m; daytime; 27 Nov 1975; coral and sand. *Sepia mestus*: 1 animal collected.

Acknowledgements

We wish to acknowledge the following colleagues who helped make the preparation of this checklist possible. From the Department of Malacology, The Australian Museum, Sydney: W.F. Ponder, organiser of the workshop, ably assisted by P. Colman, I. Loch, B. Duckworth, M. Burch and E.K. Yoo. The Lizard Island Research Station is gratefully acknowledged as are former Director, S. Domm and current Co-Directors, B. Kojis and N. Quinn. P. Colman, I. Loch and W. Ponder were diving/collecting partners and also provided much assistance during subsequent visits to the Australian Museum in search of additional records of Lizard Island cephalopods. M.J. Sweeney, Department of Invertebrate Zoology—Mollusks, National Museum of Natural History, Smithsonian Institution, provided technical assistance and prepared the map. Diving and technical assistance was given by E.C. Roper and C.T. Roper. I.H. Roper assisted with the preparation

of the manuscript and L. Giuliani typed it. C.C. Lu, Department of Invertebrate Zoology, Museum of Victoria, Melbourne, is gratefully acknowledged for discussions concerning systematics and distribution of Australian cephalopods and for reviewing the manuscript. The manuscript also was reviewed by W. Rudman, I. Loch and P. Colman of the Australian Museum. Support of the Director's Office, National Museum of Natural History, the Fluid Research Fund, and the Research Opportunities Fund, Smithsonian Institution is gratefully acknowledged.

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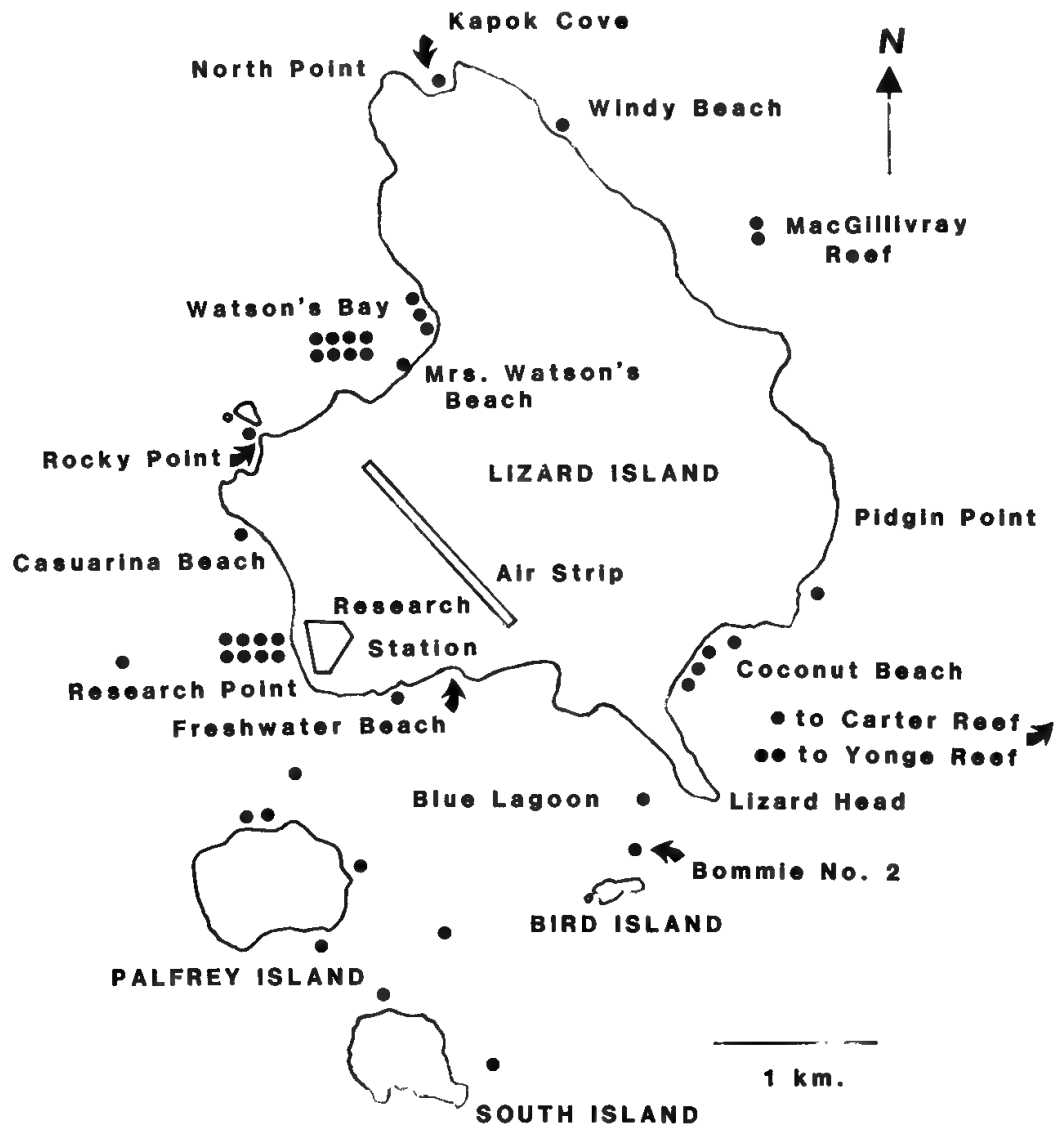


Figure 1. Map of Lizard Island (14°40'S, 145°28'E) and vicinity with locations of collecting stations indicated by solid dots. See text for station data.

Types of Parastacidae (Crustacea: Decapoda) held in the Museum of Victoria

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Abstract. Lew Ton, H.M. and Poore, G.C.B. (1987). Types of Parastacidae (Crustacea: Decapoda) held in the Museum of Victoria. *Occasional Papers from the Museum of Victoria* 3: 21-29.

Type designations, identifications, and locality labels of type specimens of 40 nominal species of Parastacidae held in the Museum of Victoria are reported and some problems over type status resolved.

Introduction

The Australian freshwater crayfish are placed in the family Parastacidae. The fauna is diverse with 10 genera and about 100 valid species.

The Museum of Victoria is a major repository of parastacid specimens. Its collection contains a significant number of type specimens but many of these were unidentified as to type status, or were wrongly labelled. With a resurgence of interest in parastacid taxonomy it is timely to resolve problems and publish a type list.

The Museum of Victoria's parastacid collection has been studied by three major workers, Geoffrey Smith, Ellen Clark and Edgar Riek. Their taxonomic publications (Smith, 1912; Smith and Schuster, 1913; Clark, 1936, 1939, 1941a, 1941b, Riek, 1967, 1969, 1972) described most of the species and specifically mentioned material in the Museum of Victoria. Until 1983 these collections were part of the National Museum of Victoria.

Only a few parastacid types were registered before 1980. As neither Smith nor Clark nominated a type specimen (as defined by article 72 in the International Code of Zoological Nomenclature) extensive series of syntypes exist. These were traced by comparison of specimens with published specimen and locality lists. It is now apparent that some type material, especially that of Clark, is lost.

This contribution lists the Museum of Victoria's type holdings of species described by the three authors mentioned, as well as those of Morgan (1986).

For each species listed the following information is given:

1. Registration numbers (with a J prefix)
2. Numbers of specimens and their status.
3. Transcripts of all labels.

All specimens are stored in 70% alcohol.

Parastacid types of G. W. Smith

Smith (Smith, 1912; Smith and Schuster, 1913) did not nominate any types and thus all the material which he or

they examined has syntype status. The material on which he worked was not returned to the Museum of Victoria until 1920. In several parts of the collection there are labels which state (in part) "Specimens named from descriptions, and *labelled by Assistant* at Oxford Museum" (our emphasis.) Thus there are none of Smith's own labels with specimens. These labels from Oxford are hand-written in ink on poor quality paper which is disintegrating ("Oxford label" in text).

It seems that when the material was unpacked, a staff member of the National Museum of Victoria (who also wrote the label described above) wrote labels in the following style (referred to as "Smith labels"):

Each label has locality and collecting data hand-printed on one side, and on the other side, the identification of the specimen written in script.

The labels were then tied on to the specimen which was wrapped in gauze, together with any other labels which may have accompanied it, and stored in a large jar with other similarly packed specimens.

Not all this material can be readily identified. Because of the method of bulk storage, and subsequent use of the specimens, labels and specimens have become separated and mixed over the years.

Parastacid types of E. M. Clark

In none of her taxonomic papers did Clark nominate holotype and paratype specimens, nor did she clearly limit her type series. Thus all of the material listed as having been examined has type status [ICZN Article 72(b)(i)]. Accordingly, all specimens have been regarded as syntypes.

Clark's normal practice was to list localities from which specimens were examined. The first locality was given as "type locality". Usually a sentence followed which stated "Type in National Museum, Melbourne" or "Types in National Museum, Melbourne". Specimens from the stated type locality usually have a label in Clark's handwriting

which gives their status as type(s) quite clearly. Specimens from other localities were not labelled as types by Clark but may have her identification label with them.

Much of the material examined by Clark cannot be found in the Museum of Victoria. In most cases, material from her type locality has been found but much of the other material appears to be lost. It is possible that some of this material, especially from non-Victorian localities is in other Australian museums.

Apart from the material from her "type locality" Clark placed very few identification labels with her specimens. Generally type material has been located by comparing the identification (usually as made by subsequent workers) and the locality list as published by Clark.

The labels in Clark's material are of four main kinds:

Type 1. Hand-written—these are in Clark's own writing and generally bear her name or initials.

Type 2. Printed (type-set) with the words "det. E. Clark" and with other information (species name, date, type status) in Clark's hand-writing.

Type 3. Printed (type-set) with the words "det. H. Clark, 1935" and with Clark's identification and the date "11-1935" in her hand-writing.

Type 4. Printed (type-set) with the words "det. E. Clark, 1939" only.

It seems that when Clark began work on parastacids she was known, at least by some, as Helen (not Ellen which is the name under which she published). A letter in the files of the Museum of Victoria refers to her as "Miss Helen Clark". The earlier hand-written labels (dated 1934) have the initials "H.C." on them. Later labels have either "E.C." or "E. Clark" written on them. The label of 1935 (type 3) is printed as "H. Clark".

Parastacid types of E. F. Riek

All Riek's type material is labelled by him in his own hand-writing with identification, type status and locality. Riek also identified numerous non-type specimens.

Taxonomic implications of Riek's (1969) revision

In parts of this paper (e.g., *Cherax bicarinatus* p. 899), Riek makes clear unambiguous lectotype designations but his nomination of a "type" for other species of which only syntypes exist may also be interpreted as designation of a lectotype (ICZN 74(a)).

It is not clear whether Riek was aware of the existence of syntypes and what he intended by use of "type". Nevertheless, use of "type" for species of which only syntypes existed must be interpreted as a lectotype designation (ICZN 74(a)). Where an individual fitting his "type" description can be identified (e.g., for *Astacopsis kershawi*) a lectotype and paralectotypes are here recognized.

More often, his nominated "type" specimen cannot be uniquely reconciled with a single animal from the syntype series and has not been labelled as "type" by Riek. In these cases no lectotype is recognized. In view of the apparent loss of numerous specimens from the collection it is possible that these "types" (lectotypes) were properly labelled as such and are also now lost. Evidence of the existence of such specimens would allow some specimens (now labelled as syntypes) to be relabelled as paralectotypes.

ASTACOPSIS

Astacopsis gouldi Clark, 1936

It is clear that Clark had a series of specimens when she described this species. Only a single specimen, labelled as "type", is in the collection.

J870 LECTOTYPE designated by Riek (1969)

"*Astacopsis gouldi* Clark. Type. det. E. Clark 1939" — type 2 label. It is assumed that this specimen comes from the designated type locality (Circular Head, Tasmania).

Astacopsis kershawi Smith, 1912

Smith (1912) described two varieties of *A. kershawi* which he referred to as "the large Gippsland crayfish" from the Moe River and "the small Gippsland crayfish" from the Narracan River. Specimens of both varieties are in the Museum of Victoria collections. As Smith did not nominate a holotype, when Riek (1969: 894) stated that a holotype, allotype and paratype are in this collection, he effectively designated a lectotype. This predates the lectotype designation of Morgan (1986).

J869 LECTOTYPE designated by Riek (1969)

"*Astacopsis kershawi* Smith" — Oxford label.

"*Astacopsis kershawi* Smith Moe River, Gippsland West, Victoria. Collected W. Kershaw -.12.1886" — Smith label. J4528 5 PARALECTOTYPES designated by Riek (1969)

"*Astacopsis kershawi* Smith" — Oxford label

"*Astacopsis kershawi* Out of Narracan River, Gippsland. Collected by W. Kershaw -.3.1890" — Smith label.

These specimens have become paratypes of *Euastacus woiwuru* Morgan, 1986.

J11962 2 PARALECTOTYPES designated by Riek (1969) and removed from J869.

Astacopsis tricornis Clark, 1936

Clark described this species from five specimens. In the collection, there are two specimens and a small vial with gills and a pereopod which have been dissected from a third specimen. Two localities are given on a single label in this jar.

In her original publication (Clark, 1936) Clark did not nominate a type specimen. However in a subsequent publication (Clark, 1939) an effective lectotype designation was made ("the type of this species is only 105 mm in length"). When this length figure is combined with the type locality data it is clear that Clark was referring to a single specimen identified by Smith (1912: 56) as *Astacopsis franklini* var. *tasmanicus*. Smith stated that this animal is 100 mm long and Clark's (1939) statement that the type measures 105 mm is regarded as a minor discrepancy in measurements.

The presence of Clark's type label and the original locality label (in the same handwriting as "Smith" labels) makes it clear that the larger specimen (our measurement of total length, 98 mm) is the one to which Clark (1941) referred to as the "type".

Neither specimen in the jar is likely to have come from Saundridge (the second locality mentioned on the label). *A. tricornis* is known only from the Lake St Clair district. The second animal is assumed to be one of the specimens from Cradle Mountain, the second locality mentioned by Clark in her publication (1936: 37). It is assumed that the

Saundridge locality refers to another specimen since removed.

J896 LECTOTYPE, PARALECTOTYPE (fragments of another paralectotype) designated by Clark (1939)

"*Astacopsis tricornis* Clark Types det. E. Clark 1936"—type 2 label.

"*Astacopsis tasmanicus* 1 spm Lake St Clair, Tas. 1.93 Pres. by Sir W.B. Spencer. 1 sp. Saundridge near Launceston, Tasm. Pres. by A. Bartholemew 24.9.88."

AUSTROASTACUS

***Austroastacus cymus* Clark, 1936**

Only seven syntypes of the 38 examined by Clark from a single locality are in the collection. An additional Riek label also recognized these as types.

J895 7 SYNTYPES

"Dondangdale, Buffalo River, Vict. Dec 1935. E. Clark"—hand-written by Clark.

CHAERAPS

***Chaeraps intermedius* Smith, 1912**

This species was described from two syntypes.

J11623 2 SYNTYPES

"*Chaeraps intermedius* Smith. W. Australia from (unclear) 30.4.80"—Smith label.

CHERAX

***Cherax albidus* Clark, 1936**

Clark stated that she examined 247 specimens of *C. albidus* from ten localities. Of these 29 are found in the Museum of Victoria. The status of most of the syntypes was deduced by comparing the locality labels (mostly hand-written by Clark) and her published list of localities (Clark, 1936: 29).

Recent work by A. Sokol (1986) has led him to conclude that Clark's type series is not monospecific. He considers J10662, J11877 and J11878 to be *Cherax destructor*. Based on Sokol's identification J13414 is herein designated as lectotype.

J872 2 PARALECTOTYPES

No locality label. "*Cherax albidus* Clark Types det. E. Clark 1936"—type 2 label.

J10662 4 PARALECTOTYPES

"Bordertown S.A. L. Larwood 1936 Don. by Sth. Aust. Mus. 1-7-1936."

"det *C. destructor* A. Sokol Aug 1986"

J10672 4 PARALECTOTYPES

"Bordertown S.A. L. Larwood 1936 Don. by Sth. Aust. Mus. 1-7-1936."

J11875 5 PARALECTOTYPES

"Nurrabel, Victoria. (F.E. Hutchinson, Nov. 1935)"

J11876 7 PARALECTOTYPES

"Nurrabel, Vict"

J11877 3 PARALECTOTYPES

"Angaston, S.A. Don. by Sth. Austrl. Mus. 1-7-1936"

"det *C. destructor* A. Sokol Aug 1986"

J11878 5 PARALECTOTYPES

"Bordertown, S.A. L. Larwood 1936"—modern transcription of damaged original label.

"det *C. destructor* A. Sokol Aug 1986"

J13414 LECTOTYPE

"det *C. albidus* A. Sokol Aug 1986"

"Nurrabel F.E. Hutchinson Nov 1935" removed from J11875.

***Cherax barretti* Clark, 1941**

This species was described from a single male specimen. The holotype is not in the Museum of Victoria.

***Cherax davisi* Clark, 1941**

This species was described from "a large series of specimens" from a single locality (Clark 1941: 34). The syntypes held in the Museum of Victoria do not comprise the entire series and were not labelled by Clark.

J877 5 SYNTYPES

"Dumaresq Creek, Armidale. 3000' Consett Davis. Nov. 36"

***Cherax destructor* Clark, 1936**

This species was described from a series of over 400 specimens from four states of Australia. Material from most of the localities listed for Victoria and South Australia is in the Museum of Victoria collections. The lectotype was collected from a pond in the grounds of the University of Melbourne and an extensive series of material from this locality exists. Smith (1912: 162) previously identified this series as *Parachaeraps bicarinatus* Grey. The pond no longer exists. The Hawthorn series mentioned by Clark is represented by 91 specimens (J1158, J10877, J10881). It appears that some of Clark's identification labels were put with the specimens some time after publication (e.g., J11891—the identification is dated 1939, yet the locality and collector are included in the list published in 1936).

Sokol (1986) did not believe that Clark's type series is monospecific. He considered that J11884, J11890 and J13415 are *Cherax albidus*. Based upon Sokol's identification J871 is herein nominated as lectotype.

J871 LECTOTYPE

"*Cherax destructor* Clark Types det. E. Clark 1936"—type 2 label.

"Pond in University Grounds, Melbourne, Vic."—hand-written by Clark.

J11880-J11889, J11894, J13415 24 PARALECTOTYPES

"Pond in grounds of University of Melbourne." Various collecting dates 1877-1888. This is the material identified by Smith (1912) as *Parachaeraps bicarinatus* Grey.

J1558 19 PARALECTOTYPES

"Quarry Hole, Hawthorn, Vic. Coll. Len. & Reg. Jones, Hawthorn, Jan. 1936"—hand-written by Clark.

J1559 17 PARALECTOTYPES

"Hawthorn, Vic. Len. & Reg. Jones, Jan. 1936"—hand-written by Clark.

J10877 28 PARALECTOTYPES

"*Cherax destructor* Clark det. E. Clark, 1939"—type 4 label. Hawthorn, Vic. (T. Quigley, Jan 1936)"—hand-written by Clark.

J10881 29 PARALECTOTYPES

"Hawthorn, Vic., (T. Quigley, Jan 1936)"—handwritten by Clark.

J11890 2 PARALECTOTYPES

"*Parachaeraps bicarinatus* Mortlake, Victoria (from Salt Creek). Colld H. Quiney Esq. 20.1.1904. D. S.W. Fulton

23.5.1906"—Smith label.

"det. *C. albidus* A. Sokol Aug 1986"—hand-written by A. Sokol.

J11891 1 PARALECTOTYPE

"*Cherax destructor* Clark det. E. Clark 1939"—type 4 label.

"from swamp at Pyramid Hill. Prestd. by Rev. E.H. Hennell 18.9.90"

J11892 1 PARALECTOTYPE

"*Parachaeraps bicarinatus* Muckleford Creek, Victoria. Colld. F.L. Billingham, — 11.1894. D. Sir W.B. Spencer."

J11893 5 PARALECTOTYPES

"Caught in a dam about 1/2 mile from Main Street, Murchison. Pres. by Neville Lyons, Murchison, 18-12-1935"—handwritten by Clark.

J11895 1 PARALECTOTYPE

"*Parachaeraps bicarinatus* Grey Det. H.C. 1934 Castlemaine, Victoria. Colld T.S. Hall. D. Sir W.B. Spencer April 1920"—Smith label annotated by Clark ("H.C.").

J11896 3 PARALECTOTYPES

"Yacka S.A. (C. Laube, 1935) Don. by Sth. Austrl. Mus. 1-7-1936."

J11897 4 PARALECTOTYPES

"Blanchetown, S.A. No. 1 Lock, R. Murray (G. Brooks, 1935) Don. by Sth. Aust. Mus., 1-7-1936"

J11898 5 PARALECTOTYPES

"Lower Light, via Two Wells, S.A. (H.T. Donnelly, 1935) Don. by Sth. Aust. Mus. 1-7-1936"

J11899 7 PARALECTOTYPES

"Ayponga S.A. Don. by Sth. Aust. Mus., 1-7-1936"

J11900 5 PARALECTOTYPES

"Mosquito Creek, 8 mls. Sth. of Naracoorte, S.A. H.A. Lindsay, 1936. Don. by Sth. Aust. Mus., 1-7-1936"

J11901 4 PARALECTOTYPES

"Onkaparinga S.A. (F.R. Ball, 1936). Don. by Sth. Aust. Mus. 1-7-1936"

J11902 5 PARALECTOTYPES

"Renmark, S.A. No. 6 Lock, R. Murray (Kennewell, 1935). Don. by Sth. Aust. Mus., 1-7-1936"

J11903 2 PARALECTOTYPES

"Kapunda, S.A. (H.L. Haines, 1935). Don. by Sth. Aust. Mus., 1-7-1936"

***Cherax punctatus* Clark, 1936**

Of the nine specimens examined by Clark, seven can be found in the Museum's collections. The type locality as published by Clark contains a typographical error and is Cooran (not Coorari).

J890 SYNTYPE

"*Cherax punctatus* Clark. Type det. E. Clark 1936"—type 2 label.

"*Parachaeraps bicarinatus* Cooran, Queensland, October 1891. In field on hillside. D. Sir W. B. Spencer April 1920."—Smith label.

J11874 6 SYNTYPES

"*Cherax punctatus* Clark"—hand-written by Clark.

"Eumundi, Queensland, (unclear) coll. J.A.K."

***Cherax rotundus* Clark, 1941**

Clark did not say how many specimens she examined but it is clear that there was more than one ("Length of average adult specimen. . ."). There is a single syntype in the Museum of Victoria collections.

J11624 SYNTYPE

"*Cherax rotundus* Clark Type"—hand-written by Clark.

"Muddy R. Severn Crayfish from E. Sutton, Fletcher, Q."

ENGAEUS

***Engaeus affinis* Smith & Schuster, 1913**

Almost all of the specimens listed by Smith and Schuster are in the collections. Those missing are at least one specimen from Warburton (Smith and Schuster had at least six) and a single specimen from Victoria.

J38451 possible SYNTYPE, 1 other specimen

"*Engaeus affinis*"—Oxford label.

"*Engaeus affinis* Upper Yarra, F.J. Williams, 2.12.1869."

Smith and Schuster stated that a single specimen with this locality and collection date was examined and that "the chelae are equal in size". Of the two specimens in this lot, one has a chela missing (the possible syntype) and the other has unequal chelae.

J3846 SYNTYPE

"*Engaeus affinis*"—Oxford label.

"*Engaeus affinis* Fernshaw, J.A. Kershaw, 12.1882"—Smith label.

J3849 SYNTYPE

"*Engaeus affinis*"—Oxford label.

"*Engaeus affinis* Upper Yarra, F.D. Williams, 1871"—Smith label.

J3853 3 SYNTYPES

"*Engaeus affinis*"—Oxford label.

"*Engaeus affinis* Warburton, S.W. Fulton, 13.11.1905"—Smith label.

J3921 2 SYNTYPES

"*Engaeus affinis* Top of Black Spur, Fernshaw, 1880"—Smith label.

J4057 2 SYNTYPES

"Warburton, 13.11.1905"

Since this specimen was registered, the original labels have been lost. The identification and locality are given as they appear in the register. Also in the jar is a label with a description of the specimen when it was alive.

***Engaeus australis* Riek, 1969**

J910 HOLOTYPE

"*Engaeus australis* Riek HOLOTYPE"—hand-written by Riek. "Lilly Pilly Gully, Wilson's Promontory Vic. 4-9-1966 R.P. Cooper"

J3910 PARATYPE

"*Engaeus australis* Riek PARATYPE"—hand-written by Riek

"Lilly Pilly Gully, Wilson's Prom Coll: J. Furphy /vi/62"

***Engaeus connectus* Riek, 1969**

Originally all Riek's type material was stored in a single jar. The holotype has been removed and registered individually. It is impossible to separate the allotype from the paratypes as two of the specimens are the same length as that given for the allotype.

J882 HOLOTYPE

"*Engaeus connectus* Riek. Holotype, Allotype and Paratypes"—hand-written by Riek, locality data as published.

J11618 ALLOTYPE, 3 PARATYPES

Removed from J882.

Engaeus fultoni Smith & Schuster, 1913

Two of the three syntype specimens examined by Smith and Schuster are in the collection. Riek (1969) erred when he recorded a specimen from Beech Forest (J901) as the "holotype" as this specimen is not part of the original syntype series.

There is a note enclosed with J3967 which indicates that the second specimen from Ferntree Gully was sent out of the Museum on loan during the 1930s. It cannot now be found.

J3967 SYNTYPE

"Engaeus fultoni Cape Otway forest, Victoria. D. S.W. Fulton Esq. 28.5.1907"—Smith label.

J3968 SYNTYPE

"Engaeus fultoni Ferntree Gully, Victoria"—Smith label.

Engaeus hemicirratulus Smith & Schuster

The majority of Smith and Schuster's syntypes are in the collection. Only the specimen from "Kongwak via Jumbunna" is definitely missing. As there are six syntypes in the collection which could be Riek's (1969) "type" this lectotype designation is disregarded.

J903 SYNTYPE

(HOLOTYPE of *Engaeus jumbunna* Riek) This specimen is labelled as coming from Kongwak but it is more likely to have come from Moyarra (see comments under *Engaeus jumbunna*).

J3991 5 SYNTYPES

"Engaeus hemicirratulus near Thorpdale. Coll. by W. Kershaw 3.90"—Smith label.

J3995 SYNTYPE

There are two labels with this specimen:

1. "Warragul, Gippsland D. Sir W.B. Spencer April 1920"—Smith label. This label has been annotated "Engaeus hemicirratulus det H.C. 1/9/34" by Ellen Clark.

2. "Kongwak near Jumbunna, S. Gippsland, Vic. Presented by A.E. Kitson Esq. 13.2.02"—old label written in pencil.

As the animal is not 50 mm long and does not have its right chela enlarged, like Schuster's specimen from "Kongwak near Jumbunna" it is likely to have come from Warragul.

J3999 SYNTYPE

"Engaeus hemicirratulus"—Oxford label.

"Engaeus hemicirratulus near Thorpdale Gippsd Coll. by W. Kershaw 3-90"—Smith label.

J4001 SYNTYPE

There are two labels in this jar:

1. "Moyarra, near Outtrim"

2. "South of Warragul, Gippsland, July 1982".

The specimen is too small, 41 mm, to be the specimen from Moyarra, stated by Smith and Schuster to be 65 mm long. It probably comes from South of Warragul.

J4101 SYNTYPE

"Engaeus hemicirratulus"—Oxford label.

"Warragul, Gippsland, Vic. Colld by Prof. Spencer"—old label hand-written in pencil.

"Warragul, Gippsland. D. Sir W.B. Spencer, April 1920".

Engaeus ignotus Clark, 1939

Described from an unknown number of specimens, the syntypes in the Museum of Victoria do not represent the entire series. Clark stated that the length of the average adult specimen is 75 mm, yet the largest syntype available is only 60 mm.

J878 3 SYNTYPES

"Engaeus ignotus Clark. Types det. E. Clark"—type 2 label.

"Smithton, Tasmania. R.H. Champion, 25-10-1935"—handwritten by Clark.

Engaeus jumbunna Riek, 1969

Riek (1969) based this species on a single specimen which he described as a male, 65 mm long, with equal chelae. The specimen (J903) labelled as holotype by Riek matches this description and therefore is his material. The type locality, Kongwak, published by Riek is identical to that given by Smith and Schuster (1913: 124) for one of the syntypes of *Engaeus hemicirratulus* and is written on the label with the holotype. However, this specimen does not match the description of the individual of *E. hemicirratulus* from "Kongwak near Jumbunna" mentioned by Smith and Schuster which was 50 mm long and with an enlarged right chela. It ties much better with their syntype from Moyarra which otherwise cannot be accounted for. It seems probable therefore that labels have been mixed and that "Moyarra near Outtrim (= Outtrim)" is the type locality of this species.

J903 HOLOTYPE

"Engaeus jumbunna Riek Holotype"

"Kongwak, near Jumbunna S. Gippsland, Vic. Presd by A.E. Kitson 13.2.02"—old label written in pencil.

Engaeus leptorhynchus Clark, 1939

None of Clark's types can be found in the collection. There is a single specimen of *E. leptorhynchus* from the type locality, but the collecting details are not as published. As none of the labels is in Clark's hand-writing it cannot be assumed that this specimen is a type. Riek (1969) stated that he had seen the "types". Whatever specimens they were, they can not now be found in the Museum of Victoria.

Engaeus marmoratus Clark, 1941

None of Clark's material can be found in the Museum of Victoria.

Engaeus orientalis Clark, 1941

Material from Scanlon's Creek and Orbost cannot be found. There is no single specimen which could be regarded as Riek's (1969) "type".

J11615 21 SYNTYPES (2 large males, 19 small juveniles)

"Cann River Valley, Vict. 11 miles North of Cann Riv. J.B. Ponder, Jan. 1938. Types Det. E. Clark."—handwritten by Clark.

J11616 2 SYNTYPES

Removed from J11615.

"E. marmoratus det. P. Horwitz, 1985."

Engaeus phyllocercus Smith & Schuster, 1913

The total number of specimens examined by Smith and Schuster is unknown. In the collections there are specimens from each of the localities listed. As in *E. orientalis* there is no single specimen which can be unambiguously identified as Riek's (1969) "type".

J3953 SYNTYPE

"Engaeus phyllocercus"—Oxford label.

"Narracan, near Narracan River, Gippsland, Vic. Collected by W. Kershaw 1889".

J3955 2 SYNTYPES (both partially dissected)

"Engaeus phyllocercus"

"Narracan River, Gippsland. Collected by W. Kershaw 1889."

Large specimen loose, smaller specimen with label tied on. Large specimen (TL = 60 mm), may be the illustrated specimen.

J11620 1 SYNTYPE

"Engaeus phyllocercus"—Oxford label.

There are three locality labels with this animal, two of which are in the standard Smith format.

1. "Top of hill near Thorpdale, Gippsland. Collected W. Kershaw 1890."

2. "Narracan, Gippsland. Collected by W. Kershaw 1889."

3. "Engaeus phyllocercus Fig spm. Top of hill near Thorpdale, Gippsland. W. Kershaw, -3-90."

The animal in the jar is definitely not the figured specimen (TL = 50 mm).

J11621 1 SYNTYPE

"Engaeus phyllocercus"—Oxford label.

"Engaeus phyllocercus"

"From small creek near Thorpdale. Collected by W. Kershaw 1890."

J11622 1 SYNTYPE

"Engaeus phyllocercus Trafalgar, Gippsland. J.A. Kershaw 2-88"—Smith label.

Engaeus quadrimanus Clark, 1936

There are six of Clark's 46 syntypes in the collection. The specimens identified as *E. cunicularius* by Smith and Schuster (J3948, J3950, J3951) are included where their locality agrees with that given by Clark. None of these specimens has labels written by Clark. Smith and Schuster identified one specimen from Lakes Entrance as *E. cunicularius*, yet there are two specimens with this locality in the collection. As there is no accompanying Clark label J3950 is regarded as a possible syntype only. There is no single specimen which could be identified as Riek's (1969) "type".

J879 2 SYNTYPES

"Engaeus quadrimanus Clark TYPES. det. Clark—11-1935"—type 3 label.

"Warragul, Gippsland, W. Kershaw 1888."

J3928 1 SYNTYPE

"Engaeus quadrimanus Clark det. H. Clark 11-1935"—type 3 label.

"Near Lakes Entrance, W.K—87"

J3948 1 SYNTYPE

"Engaeus cunicularius"—Oxford label.

"Croydon, Victoria. S.W. Fulton. 28.5.1907"

J3950 1 possible SYNTYPE

"Engaeus cunicularius"—Oxford label.

"Near Lakes Entrance, Gippsland. Collected W. Kershaw 1887."

J3951 1 SYNTYPE

"Engaeus cunicularius"—Oxford label.

"Derby River, Wilsons Promontory. Collected J.A. Kershaw. Xmas 1905"—Smith label.

Engaeus sericatus Clark, 1936

Only nine of Clark's 30 syntypes can be found. There is no single specimen which can be identified as Riek's (1969) "type".

J905 2 SYNTYPES

"Engaeus sericatus Clark. Types det. E. Clark 1936"—type 2 label.

"Croydon, Victoria. S.W. Fulton" This label is in Clark's hand-writing.

J3939 3 SYNTYPES

"Engaeus sericatus Clark det. E. Clark 1936"—type 2 label.

"Mortlake, Victoria."

J3941 SYNTYPE

"Mortlake, Victoria. Colld H. Quiney Esp. 14.12.1903. D. S.W. Fulton 23.5.1906."

J3942 4 SYNTYPES

"Engaeus sericatus Clark. det. E. Clark 1936"—type 2 label.

"Engaeus sericatus Clark. Warburton, Victoria. S.W. Fulton & J.A. Kershaw"—hand-written by Clark.

Engaeus tuberculatus Clark, 1936

Only two of Clark's 43 syntypes can be found. There is no single specimen which can be identified as Riek's (1969) "type".

J883 2 SYNTYPES

"Engaeus tuberculatus Clark Types"—hand-written by Clark.

"Sherbrook Fall, Vict. (on hill). N.V. Favaloro Esq. 6.11.26"

Engaeus urostrictus Riek, 1969

All of Riek's types are in the Museum of Victoria.

J902 HOLOTYPE

"Engaeus urostrictus Riek HOLOTYPE"—handwritten by Riek.

"Dandenong Creek, at Alpine Road, Vic. J. Kane 24.3.1963."

J911 2 PARATYPES (females)

"Engaeus urostrictus Riek Type series"—handwritten by Riek.

Locality as for holotype.

J11619 3 PARATYPES (juveniles)

Removed from J911

Engaeus victoriensis Smith & Schuster, 1913

Described from an unknown number of specimens from nine localities. The Museum has 15 syntypes from seven localities in its collections. The "Oxford label" accompanies all lots except J3897. Riek's (1969) use of "type" uniquely identified the specimen from the Dandenong Ranges. This lectotype cannot now be found. All the remaining specimens are paralectotypes.

J3877 1 PARALECTOTYPE designated by Riek (1969)

"*Engaeus victoriensis* Victoria. J.A. Kershaw"—Smith label.
 J3878 2 **PARALECTOTYPES** designated by Riek (1969)
 "Engaeus victoriensis Emerald, Victoria. Collected E. Jarvis -8-04"—Smith label.
 J3879 2 **PARALECTOTYPES** designated by Riek (1969)
 "Engaeus victoriensis Ferntree Gully, Victoria. D. Sir W.B. Spencer, April 1920"—Smith label.
 J3888 1 **PARALECTOTYPE** designated by Riek (1969)
 "Engaeus victoriensis Ringwood, Victoria. Rev. E.H. Hennell -11-1890"—Smith label.
 J3892 6 **PARALECTOTYPES** designated by Riek (1969)
 "Engaeus victoriensis Victoria (-3-80) D. Sir W.B. Spencer April 1920"—Smith label.
 J3895 1 **PARALECOTYPE** designated by Riek (1969)
 "Engaeus victoriensis Box Hill, near Melbourne, Victoria. D. S.W. Fulton 8-11-1905"—Smith label.
 J3897 1 **PARALECTOTYPE** designated by Riek (1969)
 "Engaeus victoriensis Sth. Gippsland, Victoria. July 1891. D. Sir W.B. Spencer April 1920"—Smith label.
 J3905 1 **PARALECTOTYPE** designated by Riek (1969)
 "Engaeus victoriensis Croydon (under logs) D. F.P. Spry 1.1.1904"—Smith label.

Engaeus villosus Clark, 1936

None of the larger specimens examined by Clark is in the collection (maximum length of syntypes is 30 mm).
 J3863 78 **SYNTYPES**
 "Engaeus villosus Clark"—hand-written by Clark.
 "Acheron River Flats. Nr. Marysville, Victoria. E. Clark, Jan. 1936"

EUASTACUS

Euastacus bidawalus Morgan, 1986

The holotype is the only specimen held in this collection.
 J4526 **HOLOTYPE**
 "Euastacus bidawalus Ident. by G.J. Morgan"
 "Chandlers Ck, 27 km N. of Cann River 37°20'S, 149°13'E coll. by G.J.M. & S.J.H. (9.11.81)."

Euastacus bispinosus Clark, 1941

Clark described this species from an unknown number of specimens. She labelled one of her specimens from the Glenelg River as "type" and another as "paratype". This does not constitute designation of a holotype since it was not done in her paper. Morgan's (1986) use of the term "holotype" is a valid lectotype designation (ICZN 74(b)).
 J875 **LECTOTYPE** designated by Morgan (1986)
 "Euastacus bispinosus Clark. Type Glenelg River, Victoria"—hand-written by Clark.
 J873 **PARALECTOTYPE** designated by Morgan (1986)
 "Euastacus bispinosus Clark. Paratype"—hand-written by Clark.
 "Glenelg River, Victoria. Coll H. Pritchard."

Euastacus elongatus Clark, 1941

This species was described by Clark from more than one specimen. There are seven syntypes in the Museum of Victoria but these do not cover all the localities mentioned in the text.

J874 SYNTYPE

"Euastacus elongatus Clark Type Echuca, Murray River"—hand-written by Clark.
 J6200 4 **SYNTYPES**
 "Jamieson River, Vic. Pres. by Mr A. Hordern Dec. 1935"—hand-written by Clark.
 J6201 **SYNTYPE**
 "Murray River, Echuca, Victoria. Dr. Harris Oct. 1935"—hand-written by Clark.
 J6216 **SYNTYPE**
 "Murray River, Echuca, Victoria. Dr. Harris Oct. 1935"—handwritten by Clark.

Euastacus neodiversus Riek, 1969

All Riek's type material is in the collection.
 J4531 **HOLOTYPE**
 "Euastacus neodiversus Riek **HOLOTYPE**"—handwritten by Riek.
 "National Park, Wilsons Promontory, 25.11.22. D. J.A. Kershaw 28.11.22. In stream on E. slope of Sealers Cover track about 1,000 ft about sea level."
 J4532 **PARATYPE**
 "Euastacus neodiversus Riek **PARATYPE**"—hand-written by Riek "Vereker Range, Wilsons Promontory, J.A. Kershaw, Xmas 1912."

Euastacus suttoni Clark, 1941

It is clear that Clark had a series of specimens of *E. suttoni*. Only one specimen is held in the Museum of Victoria. Riek (1969) designated a lectotype by the words "Holotype male in MN". The only specimen in this collection is a female, not labelled by Riek so may be considered a paralec-totype only if the existence of Riek's male can be confirmed.
 J877 **SYNTYPE**
 "Euastacus suttoni Clark Wyberba, Qld. E. Sutton"—hand-written by Clark.

Euastacus woiwuru Morgan, 1986

All of Morgan's types are in the Museum of Victoria.
 J4527 **HOLOTYPE** male
 "Dobson's Creek, Dandenong P. Horwitz, 9.6.82."
 J4528 5 **PARATYPES**
 See *Astacopsis kershawi*
 J4529 2 **PARATYPES**
 "Euastacus woiwuru Paratypes Det G.J. Morgan"—hand-written by Morgan.
 "Euastacus cf. kershawi In a creek crossing Clegg Rd at its lowest point near a railway bridge between Mt Evelyn & Wandin. Taken in nets 4 pm—cloudy day in 2' water. J. Kane /9/63"
 J4530 1 **PARATYPE**
 "Euastacus woiwuru Paratype Det. G.J. Morgan"—hand-written by Morgan.
 "Euastacus nobilis"
 "Mason's Falls Coll. D. Denning 14.3.63"

GEOCHARAX

Geocharax falcata Clark, 1941

Clark gave no indication of the number of specimens which she examined. The Museum of Victoria holds a series

of 21 syntypes. Riek's (1969) "type" (lectotype) is identified as J898, which contains his hand-written label.

J894 10 PARALECTOTYPES designated by Riek (1969)
"Geocharax falcata Clark. Types"—hand-written by Clark.

"Fyans Creek"

"South of Divide Grampians Dec 21st-31st 1934"—handwritten by Clark.

J898 1 LECTOTYPE designated by Riek (1969)

"Geocharax falcata Clark Type series"—hand-written by Riek.

From Fyans Creek, the locality details are as in J894 (modern copy of an old label).

J11879 10 PARALECTOTYPES designated by Riek (1969)

"Grampians Dec 21st-31st 1934"—hand-written by Clark.

Geocharax gracilis Clark, 1936

The collection contains 33 syntypes and another seven possible syntypes (J11880). The possible syntypes have two locality labels, which differ, but one of these is the original Smith label belonging to animals collected from Clark's type locality. It appears that Clark separated some of these specimens (J907) and placed her own labels with them. Riek's (1969) "type" cannot be identified as a single specimen.

J907 5 SYNTYPES

"Geocharax gracilis Clark. Types"—hand-written by Clark.

"Gellibrand River, S. of Colac, Coll'd by W.H. Hill Esq. -3.96"—hand-written by Clark.

J11880 7 possible SYNTYPES

"Gellibrand River, S. of Colac, Victoria. Colld by W.H.F. Hill Esq.—3.1896. D. Sir W.B. Spencer, April 1920"—Smith label.

"Victoria. D. S.W. Fulton"—Smith label.

J13413 28 SYNTYPES

"Portland, Vic. L.R. Kurtze, Sept 1935"—hand-written by Clark.

Geocharax laevis Clark, 1941

Clark based this species on a single specimen (Clark 1941b: 35). There is no specimen in the collection with a Clark label. The holotype is considered to be the specimen of *Geocharax laevis* which comes from Clark's type locality. A second specimen, (J963) labelled by Riek as "Geocharax laevis Clark Type series" is presumably the "type" which he examined (Riek, 1969: 889). It carries no locality label and cannot be regarded as the type specimen.

J11617 HOLOTYPE

"D. Mahony Bunyip 1932"

"HOLOTYPIC *E. laevis* P. Horwitz det 1985."

Geocharax lyelli Clark, 1936

Clark described this species from three specimens (two males and one female). Only the males can be found in the Museum of Victoria collections. The specimen which bears Riek's label is his "type" (= lectotype).

J904 1 LECTOTYPE designated by Riek, 1969

"Geocharax lyelli Clark. Type series"—Riek's hand-writing.

"Geocharax lyelli Clark Vic.; Gisborne. Col: G. Lyell. 21.9.36"—modern copy of old label.

J906 1 PARALECTOTYPE designated by Riek, 1969

"Geocharax lyelli Clark Types"—hand-written by Clark.

"Gisborne, Vict., G. Lyell, 21-9-1936"—hand-written by Clark.

GRAMASTACUS

Gramastacus gracilis Riek, 1972

Four of Riek's paratypes are in the Museum of Victoria.

J884 4 PARATYPES

"Dwyers Creek, Grampians, Vic. E.F. Riek, 23 Nov 1969"

Gramastacus insolitus Riek, 1972

Four of Riek's paratypes are in the Museum of Victoria.

J909 4 PARATYPES

"8 km SW Moyston Vic. E.F. Riek, 16 Nov 1969"

PARASTACOIDES

Parastacoides inermis Clark, 1939

It is not clear how many specimens Clark examined, but she gives the length of the largest as 50 mm. As Riek's "type" cannot be identified as a single specimen, these are considered still to be syntypes.

J889 2 SYNTYPES

"Parastacoides inermis Clark. Type det. E. Clark"—type 2 label.

"Adamson's Peak, Tasmania. 2850 ft. Coll. J. Thwaites, Hobart"

Parastacoides insignis Clark, 1939

Clark's syntype series consists of an unknown number of specimens, of which the adults measured an average 75 mm (Clark 1941b: 126). The largest specimen in the Museum of Victoria is 52 mm. There is no evidence that Riek (1969) made a valid lectotype designation.

J899 8 SYNTYPES

"Parastacoides insignis Clark. Types. det. E. Clark"—type 2 label.

"New Harbour, 27-1-26. In bottom grass. Copy of old label"

Parastacoides sternalis Riek, 1967

This species was described from a single specimen.

J897 HOLOTYPE

"Parastacoides sternalis Riek HOLOTYPE"—hand-written by Riek.

"Tas. NE of Mt. Bowes. A. Neboiss, 11 Feb. 1965"

Parastacoides pulcher Riek, 1967

All Riek's type material is in the Museum of Victoria.

J908 HOLOTYPE

"Parastacoides pulcher Riek. HOLOTYPE and 3 juveniles"—hand-written by Riek.

"Lake Pedder, Tasmania. A. Neboiss, 1 Feb. 1955."—3 juvenile specimens removed and registered as J11624.

J11624 3 PARATYPES (juveniles)

Removed from J908.

PSEUDENGAEUS

Pseudengaeus sternalis Clark, 1936

It is not known how many specimens Clark examined, but she clearly had more than one (Clark, 1936: 48). As

only one locality was given by Clark, the specimen in the collections should be regarded as a syntype. A label saying "HOLOTYPE" of unknown origin has been placed with this specimen. Riek's hand-written label suggests that this is his "type". This specimen is therefore the lectotype. J900 LECTOTYPE designated by Riek

"Pseudengaesus sternalis Clark. det. H. Clark -11-1935"—type 3 label.

"Warragul, Gippsland. J.A. Kershaw 12-1899."

"Engaeus sternalis (Clark) E.F. Riek, 1967"—hand-written by Riek.

Pseudengaesus strictifrons Clark, 1936

None of Clark's syntypes is in the collections.

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